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Cuba:
Agricultural Transition and Food Security in a Global Perspective

Olivia Riera and Johan Swinnen

KU LEUVEN

Faculty of Economics and Business

LICOS Centre for Institutions and Economic Performance
Waaistraat 6 – mailbox 3511
3000 Leuven
BELGIUM

TEL:+32-(0)16 32 65 98
FAX:+32-(0)16 32 65 99
http://www.econ.kuleuven.be/licos

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Olivia Riera[1] and Johan Swinnen[1,2,3]

[1] LICOS Centre for Institutions and Economic Performance and Faculty of Economics, University of Leuven, Belgium

[2] CEPS Center for European Policy Studies, Brussels, Belgium

[3] Centre for Food Security and the Environment, Stanford University, United States

Abstract

This paper reviews the situation in the agricultural sector and food security in Cuba and in particular the transformations that have (not) taken place since 1990. We compare the Cuban transition with transitions in other "transition countries" and show that Cuba does not fit easily in one of the transition patterns, and, in a way, has characteristics of "a bit of everything". To conclude, we discuss the (potential) effects of the recent policy changes.

Key words
Agriculture, Food Security, Economic Transition, Cuba

JEL codes
O13, P21, Q13, Q18

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Corresponding author: Olivia Riera, olivia.riera@kuleuven.be, +32 16 32 65 86, Waaistraat 6 bus 3511, 3000 Leuven, Belgium

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1. Introduction

Barack Obama and Raul Castro' joint announcement in December 2014 that the USA and Cuba would resume diplomatic relations came as a surprise and marks a profound transformation in the relations between the two countries in 50 years. The announcement followed months of secret negotiations. The deal implies important changes: the relaxing of travel restrictions can increase the number of US visitors. The permission of commercial trade in the private sector can boost growth of private business. The possibility to conduct bank transfers and the raise of the limit on remittances will most likely increase financial flows between the two countries. However, the agreement does not end the embargo (which can only be lifted by the US Congress). Firms still cannot invest on the island and trade with state enterprises (which make up the bulk of the economy) is still prohibited.

The timing of Cuba's new deal with the US coincides with deep economic turmoil in Venezuela, who had replaced the Soviet Union as major subsidizer of the Cuban economy, especially under former President Hugo Chavez. It seems Cuban leaders want to avoid a repetition from the past, when the sudden collapse of its benefactor, the Soviet Union, led to a collapse of its economy. It is likely no coincidence that the talks apparently started in 2013, shortly after Chavez's death. While Venezuela has provided Cuba substantial support (estimated at around 5 billion US$ per year) for a decade, the recent collapse in oil prices undermines its capacity to continue to act as a benefactor (Lansberg-Rodriguez, 2014). In the same way as Cuba substituted the Soviet Union with Venezuela, it now hopes to replace Venezuela with US$ inflows from tourism, remittances, trade and investment.

However, the importance of these inflows will strongly depend on the regulations and economic policies in Cuba itself. The country has seen significant policy changes in the last five years but there are serious doubts that Cuba will fully liberalize its economy and transform into a democracy in the near future. Raul Castro has not modified his discourse since he became President in 2008 and recently made clear that the Cuban leadership would not give up the ideas for which it has fought so long, in exchange for improved relations with the US. He remains a sharp critic of the actual western economic model and has expressed his preference for the 'Chinese model', a coexistence between a more open economy and a rather tight political system. His official aim still is to 'make socialism sustainable and irreversible' (The Economist, 2012).

In this paper, we review the situation in the agricultural sector and food security and in particular the transformations that have (not) taken place since 1990. With Cuba currently importing about 80% of domestic food requirements and the agricultural sector employing many poor people, but performing poorly since decades, the agricultural sector is an important element of the country's overall economic performance and a key element of its transition. Successful agricultural reforms could enhance food security by boosting domestic food production. It would reduce the extreme dependence on food imports. It would also reduce pressure on the budget, which is also burdened by severe inefficiencies of the highly subsidized food procurement and distribution system. For half a century this system has been a cornerstone of the Cuban model by providing subsidized food items for all Cuban households. However, the system is increasingly unsustainable. Hence, the transition and reforms of the agri-food system had, and will have, major impacts on poverty and the welfare of the population.

As a point of reference, we compare the Cuban transition with transitions in other "transition countries", i.e. countries which have moved (to various extents) from a socialist central planning system towards a market economy. One of the conclusions of this comparative

analysis is that Cuba may have followed the "Chinese model" to some extent in the political arena by keeping the Communist Party in power but it is far away from the Chinese model in its (agricultural) economic transition.[1]

That said, taking into account its low income level, Cuba has done much better than other countries in terms of food security. Only in the early years after 1990 did food security worsen but since then, the level of undernourishment has decreased significantly and is now one of the lowest among emerging and developing countries.

Our paper is organized as follows. Section 2 puts the reforms into a global perspective by comparing Cuba's reforms and transition with the transition patterns in other countries. Section 3 reviews the economic and institutional reforms since 1989 in Cuba. We identify several periods and we have organized our discussion in a chronological way. In section 4, we discuss the (potential) effects of the (recent) changes and the prospects for the economic and agricultural future of the country. Section 5 concludes.

2. A Comparative Perspective on Agricultural Transformation

Soon after the death of Mao in 1976, China launched its economic reforms by implementing the household responsibility system, a radical reform of the Communist farming system, in which land was taken from the commune farms and given back to families to farm on (Huang & Rozelle, 1996). This started an unprecedented area of growth and further liberalization of the economy. A decade later, the Berlin Wall fell and the Soviet Union collapsed. Both events mark the start of a massive set of political, economic and institutional changes in Europe and Asia. In total, almost 30 communist countries embarked on their

[1] This paper will not focus on political transition. But even in politics there are important differences between China and Cuba. While the CP has remained in power in both countries, the leadership changes on a regular basis in China, unlike Cuba.

transition to a market economy. They covered a huge area with a population of more than 1.5 billion people (Swinnen & Rozelle, 2006).

The transition processes in these countries and their effects have been very heterogeneous. China, as is well known, has combined successful economic liberalization with political stability and moderate political reforms inside the Communist party system. Countries such as the Baltic states moved from the Soviet system to well-functioning democracies, fully embraced a market economy and are now full members of the European Union (EU) and NATO. Other countries, such as Turkmenistan and Uzbekistan, have moved from a Moscow-based autocratic political model and central planning economic system to a similar model, now centered in the country's capital. And several are somewhere "in between".

However, not only European and Asian countries were affected by these dramatic institutional, political and economic transformations. Also countries in other continents which were heavily dependent on the Soviet Union, or integrated in the Council of Mutual Economic Assistance (CMEA) system were affected, sometimes quite severely.

Cuba is one of them. Cuba was deeply depending on trade in the CMEA system and on economic support from Moscow before the fall of the Berlin Wall. The changes overseas also triggered steps in Cuba towards a market economy and some liberalization of the economy has occurred since the 1990s.

The different reform choices and their effects not only applied to the general political and economic situation but also to specific sectors. Almost everywhere agriculture and food security was an important and politically sensitive element of the reforms. In the poorest transition countries, such as China, most people worked in agriculture and food was a major consumption item. Many countries were important traders of food and other agricultural products such as grain (e.g. Russia, Ukraine, Hungary and Bulgaria), sugar (Cuba) and cotton (Uzbekistan). And in all countries land reforms were a major political issue, often involving

claims on land and real estate from those who were expropriated during the Communist regime (Swinnen, 1999).

However, there is much heterogeneity among transition countries in how they reformed their agri-food systems and its effects. In a comparative study of the agrarian reform processes in Communist regimes and their effects, Macours & Swinnen (2002) and Rozelle & Swinnen (2004) identify several "patterns of transition". They show that the performance of transition countries and their different patterns are due to a combination of differences in initial conditions and in reform choices. In this paper, comparative tables and figures include indicators for the 3 "transition patterns" – those of China, Russia and Central Europe (see Macours & Swinnen, 2002). In addition we include data for the Baltic countries as an extra comparison since these countries resemble the Cuban transition performance over the 1990-2004 period while diverging strongly after 2004.[2,3]

Table 1 compares the initial conditions of Cuba with these of other transition countries.[4] Several important observations can be made:

- Cuba is one of the transition countries with the shortest period under socialist rule[5]: 30 years, which is almost a decade less than the East European countries where central planning was imposed after the Second World War, and 40 years less than many Soviet countries where it was imposed in the first part of the 20th century.

[2] Detailed data and analysis on all other transition countries are available in Swinnen & Rozelle (2006) and Swinnen et al. (2005).

[3] The Baltics include Estonia, Latvia and Lithuania. Central Europe includes the Czech Republic, Hungary, Poland and Slovakia.

[4] Initial conditions from all transition countries are shown in Table A1 in the Appendix.

[5] Other countries with a relatively short Communist rule are Vietnam and Laos with 21 and 16 years (Macours & Swinnen, 2002).

- At the outset of transition, Cuba had a much higher income per capita (2,000US$ in 1989 PPP) than China (2.5 times higher) but much lower than in other transition countries (3-4 times lower). Its income per capita was close to that of Mongolia.
- What is remarkable is the relatively small share of agriculture in employment and in GDP in Cuba. Typically countries with such low level of income have much more people employed in agriculture. Cuba's share of employment in agriculture (19.1%) was much lower than in China (70%). It was closer to that of Bulgaria, Lithuania or Armenia, but significantly lower even than e.g. in Romania or Poland (both more than 25%).
- In terms of agricultural technology, the labour intensity (labour/land ratio) of 0.22 was that of a medium labour-intensity agricultural economy[6], in between the labour intensive agricultural economies of e.g. China (0.67) and the extensive labour economies such as Russia (0.04).
- The exposure and integration to the CMEA trade system (24% of GDP) is equal to that of many Former Soviet Union (FSU) countries such as the Baltics (and even higher than Russia) and considerably higher than the other transition countries in Central Europe or China. From this perspective, one could argue that the Cuban situation was equivalent to being part of the Soviet Union.
- As in Russia and Central Europe, Cuban agriculture and its food consumers were heavily subsidized. While farm and food prices were distorted everywhere and prices for inputs and outputs were set at artificial levels, the pre-reform situation was very different in China where farmers were taxed by the state procurement system. As in the other Communist

[6] It was close to that of countries such as Armenia, Georgia, Poland, Romania and Moldova.

regimes the vast majority of the land was controlled by the State. Only about 14% of agricultural land remained in private farming in Cuba.[7]

In summary, the review of these initial conditions suggest that Cuba did not easily fit into one of the categories (similarities). It had in common with China that it was poor, but it was much more exposed to the CMEA system and its regulations and implicit subsidies were closer to the Soviet system. Its agricultural technology was much less labour intensive and more depending on external inputs than the Chinese, resembling more that of Central and Eastern Europe and the Soviet Union.

As studies have shown, these conditions matter to understand the liberalization effects (Macours & Swinnen, 2002; Rozelle & Swinnen, 2004; Swinnen et al. 2010). In the next section, we will first review the Cuban transition and later turn back to the global perspective to interpret the Cuban reforms and their effects.

3. A Brief Economic History of Revolution and Reforms in Cuba

One can identify five periods from the revolution in 1959 to the most recent economic reforms: Period I is the time between the revolution of 1959 to the fall of the Berlin wall in 1989. Period II are the years 1990-1993 when the effect of the dissolution of the Soviet Union hit. Period III (1993-2003) was characterized by initial liberalization measures and a decade of relative recovery. In 2003-2008 (Period IV), the liberalization process was reversed and a new set of regulations were put in place which were associated with a decline in agricultural production. Period V starts when Raul Castro took power in 2008 and launched a process of economic transformation identified as an "update of the economic model", culminating in the recent agreement reached in December 2014 to resume diplomatic talks with the USA.

[7] The only countries where private farming remained dominant under communism were Poland and Slovenia (Swinnen, 1999).

3.1 Period I: Revolution and pre-reform period (1959-1989)

When Fidel Castro came to power after the revolution of 1959 that defeated the government of the autocratic dictator Fulgencio Batista, he implemented profound institutional and policy changes which transformed the Cuban economy to a centrally planned socialist system. The objective of the new economic system was to reduce income inequality and dependence on the USA and stimulate economic growth and employment.

One of the most significant policies were the land reforms of 1959 and 1963 which nationalized farm land, expropriating first foreign (US) agricultural companies and then medium-sized Cuban farmers. As a result, by 1963 about 70% of the country's farm land was under state control (Marrero, 1982). In response to the nationalization of land and Cuba's alignment with the Soviet Union during the Cold War, the US government imposed an economic embargo in 1962.[8]

At the same time, the Cuban leaders decided to switch from trading with the US to deeper economic integration and exchange with other Socialist countries. In 1972, it joined the international CMEA system. The decision to trade primarily with other socialist markets significantly influenced production and trade. Cuba specialized in the export of primary goods when joining the CMEA. In the 1980s, at the eve of the fall of the Berlin wall, no less than 63 % of sugar exports, 73% of nickel exports and 95% of citrus fruit exports were destined to CMAE countries. More than half of the arable land of the country was used for the production of exported products. At the same time, food imports were high. According to Molina (2005), 50% of the calories consumed in that period were imported.

In addition, despite structural changes and despite an official average annual GDP growth of 4.5% between 1959-1989 (Molina, 2005), the country remained severely reliant on

[8] Economic sanctions were reinforced first in 1992 when US subsidiaries in other countries were prohibited to trade with Cuba and later in 1996 when foreign companies doing business in Cuba were prevented to do business in the United States.

external funding. The Soviet Union heavily subsidized Cuba's economic model by providing, at preferential rates, 63% of Cuba's food imports, 86% of raw materials, around 77.5% of machinery and almost 100% of the fuel imported (Rodriguez, 1992). Cuba was thus strongly depending on imports from the Soviet Union for food and crucial inputs for industry. Obviously, this made Cuba also highly dependent on the performance and functioning of the Soviet Union and the CMEA.

3.2 Period II: Dissolution of the Soviet Union (1990-1993)

When the Soviet Union and the CMEA system collapsed, Cuba lost its major markets and primary source of foreign assistance. Between 1989 and 1991, exports declined by 80% and imports by 75%. Food and oil imports fell by 50%. The crisis was widespread and hit all sectors of the Cuban economy. There was a shortage of food, fuel, manufactured products and raw materials. All this translated into a sharp reduction in consumption and standards of living. GDP shrank by 25% (Figure 1).

Agriculture was hit particularly heavily. The availability of fertilizers and pesticides collapsed by 70% (Molina, 2005). Gross Agricultural Output (GAO) declined by 40% between 1990 and 1993 (Figure 2). Agricultural labour productivity (ALP) fell by 40% and average yields by 34% (Figures 3 and 4).

Sugar production, the main agricultural export, which was heavily subsidized and on which the economy was heavily dependent since the 18th century was particularly affected. Since 1960s, Cuba was one of the top 3 sugar producers in the world. But between 1990-1993, production decreased by almost 50% and the decline continued afterwards (Figure 5). In contrast, the fruit and vegetable sector resisted relatively well, with a moderate decrease in total production of 16% between 1990-1993 (Figure 6).

Food security declined with falling food imports and the falling local production: caloric intake fell by 21% and the prevalence of undernourishment increased from 7,8% to

20% (FAO, 2014; IFPRI, 2014) (Figure 8).[9,10] The rationing system which provides Cubans the right to purchase basic foodstuffs at subsidized prices was expanded to encompass nearly all consumer goods and rations were cut such that they covered barely half of monthly food needs of the average consumer. Prices grew rapidly and so did the black market (Carter, 2013).

3.3 Period III: Market oriented reforms during the "Special Period" (1993-2003)

In response to the crisis, the Cuban government enacted an emergency plan in 1993 referred to as 'A Special Period in Time of Peace'. The Special Period plan selectively liberalized key sectors of the economy and introduced structural changes to stabilize the economy. Between 1993 and 1996, the Cuban government legalized the holding and use of foreign currencies, enacted a new tax code, a foreign investment law**,** and a banking reform establishing the Central Bank and regulating the supervision of commercial banks and financial institutions (Perez-Lopez, 2002).

In the agricultural sector three major reforms were implemented. One key reform was the transformation of state farms into "Basic Units of Cooperative Production" (UBPCs), a form of agricultural cooperatives. While land titles were still the property of the state, these cooperatives received usufruct access to land for farming. They were now allowed to keep any additional output they produced after meeting production quotas for the state procurement system. However, their ability to make production and resource decisions remained limited, because the state still dictated what commodities they could produce and provided them with food collection, transportation, agricultural inputs (to the limited extent they remained available) and other production services (Perez & Vidal, 2010). In addition, the state

[9] Data on daily per capita intakes of calories varies slightly according to different sources (FAO and official Cuban statistics) but the general trend is consistent. See Alvarez (2004a) and Franco et al. (2007) for further details.

[10] The prevalence of undernourishment expresses the probability that a randomly selected individual from the population consumes an amount of calories that is insufficient to cover her/his energy requirement for an active and healthy life. The indicator is computed by comparing a probability distribution of habitual daily Dietary Energy Consumption with a threshold level (the Minimum Dietary Energy Requirement) (FAO, 2014).

procurement agency, *acopio*, purchased most of the output at government-fixed prices which were set below market prices. The impact of the reform was less successful than hoped. Mesa-Lago & Perez-Lopez (2013) estimate that less than half of the UBPCs were commercially viable in 1995, with the rest requiring state subsidies.

Second, complementing the creation of the UBPCs and to further incentivize production and reduce the role of agricultural black markets, the government reduced the scope of the rationing system, authorizing the creation of agricultural markets where producers could sell their surplus production of selected agricultural products beyond state-mandated quotas at market prices (Torres, 2010). As noted by Messina (2009), these agricultural markets served an important role in broadening the availability of food outside the ration system.[11,12] According to USDA (2008), by 2000 they handled 25% to 30% of the farm products for domestic consumption.

Third, the state authorized self-employment in around 150 occupations ranging from transportation to agricultural and personal services and home repair (Perez-Lopez, 2002). However, these were still subject to several restrictions such as the ban to hire workers, constraints on how goods and services produced were sold, high fees and taxes, etc.

While there remained many obstacles, with these market-oriented reforms, Cuba's economy started to recover. According to official Cuban statistics, the economy has recorded positive growth since 1994 (although the growth rate has fluctuated significantly from year to year) (Figures 1a and 1b). By 2003, GDP growth was at 3.8%.

[11] According to Messina (2009), the creation of UBPCs marked the beginning of a significant process of transformation in the structure of Cuban agricultural production. For further details, see Nova (1998) and Messina (2009). They provide detailed analyses about the changes in the production and marketing structures implied by these reforms.

[12] In this period, the ration system was estimated to supply on average 34% of the daily caloric requirement, 32% of the total protein and 34% of fat intake (Carter, 2013).

Agricultural production increased by 33% between 1994 and 2003 (FAO, 2013) but did not reach pre-1989 levels. Between 2000 and 2003, output stabilized at 20% lower than the 1989 output. After a decade of growth productivity had recovered by 2004: ALP and yield levels got back to 1989 levels, 14 years after the fall of the Soviet Union (Figures 3 and 4). However these aggregate indicators hide much heterogeneity among commodities.

After a collapse in output and productivity by 50-60% between 1991-1993, the decline in sugar production continued until 2005. In 2002 a radical plan to restructure the sugar sector was announced. About half of the sugar mills were closed. The drastic restructuring of the sector resulted in a further collapse in sugar production between 2002 and 2005 (Figure 5) (Alvarez & Perez-Lopez, 2006; Hagelberg & Alvarez, 2006).[13] By 2005, sugar cane production was 85% lower than in 1989. Yields recovered a bit from their lowest levels of 1995, but by 2012 yields were still more than 30% lower than in 1989.

In contrast, production of fruits and vegetables increased significantly, especially between 1994 and 2004 (Figure 6). This can partly be explained by the rise of urban agriculture designed to address the shortage of fuel and inputs post-1989. Urban gardens were particularly productive and successful in growing (mostly organic) fruits and vegetables which are labor-intensive. Between 1997 and 2003, vegetables produced in the capital city of Havana increased from 21 tonnes to 254 tonnes (Koont, 2009).[14] By 2004, fruit and vegetable production was 250% higher than before 1989. The sharp growth of fruits and vegetables compensated for the decline in sugar production, especially in the 2002-2004 period (see Figure 7). [15]

[13] According to Hagelberg & Alvarez (2006) which presents a short historical review of sugar cane production in Cuba, precise data to evaluate the immediate effect of the radical restructuring of the sugar sector in 2002 is not available. We rely on data compiled by the FAO.

[14] See Zepeda (2003), Koont (2009) and Wright (2012) for details on the success of urban agriculture in Cuba.

[15] The contribution of fruits and vegetables in total GAO has also increased significantly, from 17% in 1993 to 48% in 2003 while the contribution of sugar in total GAO has decreased from 52% to 19% in the same period (see Table A2 in appendix for details).

On average, food availability and security also improved over the period 1993-2003. By 2000, per capita consumption had recovered to pre-transition levels, averaging 3,000 calories per day (FAO, 2014). Average food availability has remained stable since then. Undernourishment also decreased considerably from 20% to 2,9% in 1999-2001 (Figure 8).

Yet the situation was still dire in the late 1990s.[16] The average monthly salary was much lower in 2002 than in 1989 while the urban population 'at risk of poverty' increased from 6.3% in 1988 to 20% in 1999 (Mesa-Lago & Perez-Lopez, 2013).[17]

Nonetheless, with the economic decline halted and growth resuming in 1994-1996, the pressure for reforms subsided. The 1993 changes were started with reluctance and much internal opposition. Reform implementation was undermined by bureaucratic opposition and missing complementary measures (Perez-Lopez, 2006). Impediments quickly grew when the worst part of the crisis passed (Gayoso, 2009). The pace of change slowed down subsequently after 1996. Except for the sugar reform of 2002, as of 1997, no other significant market-oriented initiative was implemented.

3.4 Period IV: Return to economic centralization (2003-2008)

The final straw for the 1990s reforms was the return of an external supporter (and financier) for Cuba's socialist system. After the election of Hugo Chavez in 1999, Venezuela replaced the Soviet Union as the great subsidizer of the Cuban economy. Venezuela started providing oil and oil products, investments, credits and subsidies to Cuba in exchange for services such as doctors, teachers, nurses and security personnel. This support permitted the

[16] This has led Perez-Lopez (2002) to qualify the 1990s has a lost decade for Cuban economic growth and for the standards of living of the Cuban population.

[17] Calculations by Vidal (2007), Pujol (2011) and Mesa-Lago & Perez-Lopez (2013) report that the average real salary declined by 82% between 1989 and 2002. These numbers seem very large given that real GDP declined by 12% over the same period.

Cuban leadership to reverse the modest reform process of the 1990s and to return to central planning.

In 2005, Fidel Castro aggressively committed to dismantle what was left of market-oriented reforms. He admitted that the leadership had made errors during the Special Period, criticized "those who thought they could build socialism through capitalist methods," and stated that the 1993-1996 reforms had to be wiped out because they had sharpened "old problems that Cuban socialism had already overcome": inequality, corruption and the creation of a rich class (Perez-Lopez, 2006).

From 2003 onwards, there was a return to economic centralization and restrictions on the already small private sector increased again (Mesa-Lago, 2006). State enterprises could no longer conduct transactions in foreign currency or directly engage in foreign trade - the monopoly on foreign trade was returned to the Ministry of Trade. The government banned the circulation of US dollars and imposed a 10% tax on the exchange of US dollars for Cuban pesos. It cancelled almost 1/3 of permits for the self-employed who had been authorized to operate (including a ban of private taxis). It imposed heavy taxes and strict regulations on private restaurants. These private restaurants were an early success story of the legalization of self-employment but the restrictive measures led to the closure of the vast majority of them (Perez-Lopez, 2006).[18]

[18] The extraordinary official GDP growth reported for 2005 and 2006, from 5.4% in 2004 to 11.8% in 2005 and 12.5% in 2006 (Figure 1) seems to suggest that the reversal of the reforms had been successful. However, as reported by Franck (2004) and Perez-Lopez & Mesa-Lago (2009) (among others), official GDP statistics and in particular these miraculous high GDP growth rates should be taken with caution. They actually resulted from several statistical manipulations: (i) the base year for national accounts calculations 'at constant prices' was shifted from 1981 to 1997 in 2001, (ii) the contribution of the service sector (banking, insurance and tourist services) was reweighted, and (iii) the value of free social services, the value of exports of professional services and the value of price subsidies to products sold through the rationing system were added to the GDP calculations in 2004. In 2007, the methodology for calculating GDP further changed, purportedly to align it further to internationally recognized System of National Accounts. Perez-Lopez & Mesa-Lago (2009) estimate that these changes in GDP calculations resulted in substantial variations in GDP levels from 0.5 to 4.2 percentage points, averaging an increase of 2 percentage points.

Also in agriculture there was a crackdown on private sector activities. Agricultural markets were raided to confiscate produce being sold in contravention of state procurement rules, and fines were imposed on those involved in "illegal sales". Vehicles used to transport "illegal merchandise" to agricultural black markets were seized. The sale of meat, fish and sea food in agricultural markets was prohibited.

The negative effects of the state interventions were reinforced by dramatic climatic events. During the 2005-2008 period, agriculture was hit by severe draughts and heavy hurricanes, severely damaging and destroying agricultural crops. The combination of the economic policies, re-imposing restrictions and turning back on earlier reforms, and harsh climatic conditions caused agricultural production to fall by 20% between 2003 and 2008 (FAO, 2013) (Figure 2). Output in most sectors including the sugar and fruit and vegetables sectors was affected. The new regulations in particular hit the thriving fruit and vegetable sector. Output fell by half between 2004 and 2008 (see Figures 5, 6 and 7).

The evolution of the food security situation during this period is mixed. Average food availability declined slightly: from 3300 kcal/capita/day to 3200 kcal/capita/day. To keep food at those levels, food imports increased by about 200% in this period (Figure 8 and 9). Undernourishment decreased further: to 1,1% in 2004-2006 albeit that there are regional disparities, with the East of the island being the most vulnerable.[19] According to USDA (2008), the sources of caloric consumption had also changed significantly and calories from animal products had dropped. The main public health problems were severe anemia among children (WHO, 2014) partly due to scarcity of iron-rich food and growing overweight and obesity in children and adults.[20]

[19] Especially the provinces of Guantánamo, Granma, Santiago de Cuba, Las Tunas, Holguín, and Camagüey.

[20] In the East, the prevalence of anemia is of 56,7% among children under 24 months and 20,1% amongst those between 2 and 5 (WHO, 2014). The share of adult and children population in overweight has increased in recent years (Carter, 2013).

However, food security is enhanced by Cuba's health system. Despite its low living standards and its closed economy, the quality of Cuba's health (and education) systems is generally considered to be of high quality (UNDP, 2010). Thanks to the government's focus on social assistance and welfare, the Cuban population has had access to improved social services since the revolution. The country has one of the highest life expectancies in Latin America (79), a very low under-5 mortality rate (5.9 deaths per 1000 births) and an impressive literacy rate (99.8 for adults > 15) (WHO, 2014). Still today, Cuban expenditures for social services (healthcare, education, pensions, housing and social assistance) are the highest among Latin America. In 2011, social services amounted to 55% of total state expenditures and 31% of GDP (Carter, 2013; ONEI, 2012). According to UNDP (2010) and WHO (2014), Cuba's education and health system have put the country well on the path to achieve the education and health-related Millennium Development Goals.

3.5 Period V: Reforms by Raul Castro (since 2008)

Fidel Castro, the Cuban leader since 1959, fell ill in 2006 and in February 2008 officially resigned from his role of President. Raul Castro, his brother, who had already assumed the presidential duties since 2006, was unanimously elected President of the National Assembly in 2008. After Raul Castro officially took power, a series of policy reforms were implemented to "update" the Cuban economic model. Reforms started slowly and modestly. Since 2010 there has been an acceleration of reforms. The Sixth Congress of the Partido Comunista de Cuba in 2011 approved several reforms which are still in the process of implementation.[21]

[21] See Chaguaceda & Geoffray (2011), Gonzalez-Corzo (2011), Castañeda (2013), Mesa-Lago (2013) and Mesa-Lago & Perez-Lopez (2013) for comprehensive discussions and reviews of the current reforms and their effects.

In 2010, a major plan was announced to dismiss about 1 million state workers (about 25% of the total public labour force). With the state employing about 90% of all workers and controlling virtually all means of production, a parallel objective of the reform was to promote the private sector and self-employment to absorb laid-off state workers. The number of categories where self-employment is authorized was extended to 178 (from 150 since 1995) and the hiring of employees is now allowed in about half of the categories. In addition, a tax reform enacted in 2012 provides tax exemptions and simplified taxes to stimulate self-employment. Official statistics (presented in Figure 10) show that the number of registered self-employed individuals jumped from 147,400 in 2010 to 391,500 in 2011, and further increased to 424,400 registered self-employed individuals in 2013 – about 8% of total employment. However, some question these numbers – or their interpretation – and claim that resistance from the bureaucracy and state managers has prevented a significant shift to self-employment. Mesa-Lago and Perez-Lopez (2013) argue that in 2011 more than two-thirds (68%) of the new self-employed workers had not held a state job before and only 16-18% were retirees or dismissed state workers.

Drivers of recent reforms of agricultural and food security policies

Several reforms specifically targeted agriculture and food security, which were considered key challenges and priorities (Nova, 2012). These reforms seem to have been inspired (or induced) by two main factors. The first was the desire of the leadership to raise domestic food production and to reduce the dependence on and costs of food imports, also from the USA. According to official statistics, in 2012 Cuba imported 80% of its domestic food requirements, including 60% of its rice requirement, the main staple (ONEI, 2012). Figures 9a and 9b illustrate how imports in general and food imports in particular have increased strongly over the past decade. Merchandise imports more than tripled over the past decade: from around

5 billion $ in 2002 to more than 15 billion $ in 2011. Food imports show the same dramatic rise: they increased from around 0.6 billion $ in 2002 to around 1.9 billion $ in 2011.

Interestingly, the USA is now the main supplier of food and agricultural products to Cuba. This has been the case since 2003, as imports from the USA have increased strongly after the relaxation of the trade embargo with the USA in 2000 (Figure 9b) (The Economist, 2012).[22,23]

A second reason for the reforms were the problems of the state food procurement and distribution system which has been a cornerstone of the Cuban agricultural and food security policy since the 1960s, but which has become a major burden on the Cuban budget and whose payment arrears have become a significant drag on Cuban agricultural producers. Besides several other inefficiencies, chronic late payments to farms resulted in disincentives and debts for farms. Despite the fact that the government tried to tackle the problem earlier, payment arrears to farms continued, amounting to 6 million CUP in 2011 (Amor, 2011)[24]. At the same time, the cost of the food rationing system, estimated at US$ 1 billion in 2011, became too heavy to be supported by the government budget (Carter, 2013).

Agricultural and food security policy reforms

The first reform was the transfer of fallow land and state-owned land to individuals and cooperative farmers under usufruct (so called "usufructuaries"). This decision was taken in

[22] In 2000, the embargo in force since 1962 was relaxed to allow sales in cash of US food and agricultural products to private farmers, cooperatives, privately owned, small-scale restaurants and NGOs (Gonzalez-Corzo & Nova, 2013). However, the Cuban government did not start to import food from the US before late 2001, after devastating damages caused by hurricane Michelle. Cuba has become one of the top 20 most important markets for US food and agricultural exports, according to Alvarez (2004a).

[23] Other major agricultural trade partners for Cuba are Brazil and the European Union (USITC, 2007).

[24] This is equivalent to 164,000 US$ (1 US$ = 36.5 CUP).

2008 and updated in 2012.[25] By December 2012, around 1.5 million hectares (representing about 23% of the country's arable land) had been distributed under this program (see Table 2).

Second, to stimulate production by the "usufructuaries", the new tax code, adopted in 2012, granted a two year exemption of income and land property taxes to these farms.

Third, agricultural producers (private farmers, cooperatives and usufructuaries) were permitted to sell (some of) their output at roadside kiosks (*puntos de venta*) near their production sites and to hotels and tourist restaurants (since 2011).[26] However, producers must first meet their quota to the state procurement agency, *acopio*, before they can sell products elsewhere. Gonzalez-Corzo (2011) also points out that state entities continue to administer the kiosks which implies that the state continues to keep a significant role in the administration of "private sales".

Fourth, the role of the state food procurement and distribution system was reduced by removing several commodities from the system.[27] The food rationing system has been a core component of Cuba's agricultural and food security policy since 1962. Under this system, farms have to sell a certain quotum of agricultural/food products to the state procurement agency, *acopio*. These products are then distributed through the state distribution system. A key element of this system is the family ration book (*libreta de abastecimento*) which provides every Cuban households the right to purchase a basket of basic food and staples at subsidized prices.[28]

[25] The decree-law no.259 was adopted in 2008. Some restrictions regarding the duration of the lease, the rules on inheritance transfers, the recognition of investments made by farmers and the hiring of temporary workers were later relaxed in 2012 through decree-law no.300.

[26] Except for dairy products, coffee and meat.

[27] These include beef, tubers, chickpeas, cocoa, cigarettes, toothpaste, soap and liquid gas. The quotas for beef and eggs was also reduced by half and the sugar quota by 20% (Mesa-Lago, 2014).

[28] The *libreta* was introduced in 1962 to address the shortage in agricultural products following the agrarian reforms and the US embargo. For excellent detailed reviews on Cuba's food rationing system, see Alvarez (2004b) and Nova (2000). Several deficiencies in *acopio* such as delays in crop collection, lack of transport, poor coordination and late payments to farmers are reported in Hagelberg & Alvarez (2007) and Mesa-Lago (2007).

However, the system suffers from several inefficiencies such as obsolete and poorly maintained transport and storage equipment leading to products spoils and losses, rigid and badly informed pricing policies and chronic late payments resulting in disincentives and debts for producers (see above).

The first change in the *acopio* system was in 2007 and 2008, when the *acopio* agency increased procurement prices for some products such as milk, meat, rice, vegetables and root crops to stimulate domestic production (Hagelberg & Alvarez, 2009). Later the Cuban government reduced the scope (and the cost) of the program by progressively removing several items from the ration card. It is estimated that the monthly ration card, the *libreta*, now covers about 10 days of consumption of the average Cuban household (The Economist, 2012). In 2011, at the last meeting of the Cuban Communist Party, the discontinuation of the *libreta* was even proposed - and is currently still being debated.

4. Reforms and Effects in Comparative Perspective

As is clear from the previous section, the reforms in Cuba have been more of a stop-and-go nature than a process of rapid liberalization ("big bang" as in Central Europe) or a process of gradual-but-consistent liberalization (as in China). Instead the process resembles many of the characteristics of the transition processes in countries which were (or still are) reluctant reformers – such as Bulgaria in the 1990s, or Ukraine and some of the Central Asian countries in the 2000s. The transition process in several of these countries was protracted and long and incomplete (Rozelle & Swinnen, 2004).

Nonetheless, it is remarkable that Cuba has maintained a high level of food security along its transition – certainly compared to other countries of similar income levels. In 1990, the prevalence of undernourishment of 7.3% was lower than in other countries with similar income (Figure 18). Plus, although undernourishment increased in the early years post-1989 to

20%, it quickly improved afterwards (Figure 8). Between 1990 and 2011-2013, undernourishment actually decreased by 92% where it reached the remarkable low level of 0.6% of the population (IFPRI, 2014) (Figure 19).[29]

1990-2004

A key factor in the collapse of output and productivity in Cuban agriculture in the early 1990s was the sharp reduction in (highly subsidized) inputs provided by the Soviet Union. This effect is common with transition countries in Central Europe and the former Soviet Union where both agriculture and food consumers were highly subsidized (often through price fixing by the state and soft budget constraints of companies).

The cut in highly subsidized inputs and the disruption of the supply systems caused a strong decline in GAO and ALP in Cuba. Both declined by more than 40%, which is among the strongest declines in transition countries. Figures 11 and 12 compare GAO and ALP patterns for various transition countries and regions. The fact that both ALP and GAO declined sharply makes Cuba fit the transition pattern of Russia and many other countries formerly belonging to the Soviet Union and not the "Central European pattern" (where ALP increased from the beginning) or the "Chinese pattern" (where ALP and GAO increased). However, the turnaround started faster in Cuba than in Russia, where the decline lasted a full decade. The first decade of transition in Cuba resembles that of the Baltic countries. Both output and productivity fell to their lowest point in 1995 and productivity growth started from then on.

The turnaround in Cuba from the mid-1990s onwards is caused by the combination of a series of economic reforms introduced in 1993, and the fact that the initial price adjustment and subsidy cut effect was "absorbed" by then. The economic reforms contributed to a decade

[29] Out of the dataset developed by IFPRI (2014) where undernourishment data is provided for 110 developing and emerging countries, only Belarus, Kazakhstan and Romania had undernourishment levels lower than Cuba in 2011-2013 (see Figure 19).

of continuous growth in productivity and output (from 1994 to 2004) with labour productivity and yields approaching levels close to the pre-1990 levels.

In fact, in 2004 ALP was higher than in 1989 and average yields were at 95% of their 1989 level. Output (GAO) had increased less – to 80% of the 1989 level – but this could be expected with a less distortionary system than before.[30] The average annual growth rate in ALP in Cuba was 7.1% between 1995 and 2000 – even higher than in Central Europe (5.9%), the Baltics (3.8%) or China (4.0%). In Russia, ALP continued to fall (-0.5%). The story of yields (land productivity) is similar.

This turnaround and growth in productivity is remarkable given the fact that the reforms at this time did not allow a major shift to individual farming (Figures 13, 14 & 15). In Central Europe and the Baltics, the (partial) shift to individual farming initially caused disruptions and productivity falls but later on sustained productivity growth (Macours & Swinnen, 2000). In China this productivity enhancing effect accrued from the start because of its low capital inputs – and thus lesser disruptions (Huang & Rozelle, 1996; Macours & Swinnen, 2002). In Cuba, the shift to individual farming was low until recently (see figure 13) and considerably below what would be predicted based on the relationship shown in Figure 14 – based on the model of Mathijs & Swinnen (1998, 2001)[31]. Hence most productivity growth came despite constraints on privatization and farm restructuring.

2005 - 2014

However, unlike the Central European and Baltic countries, Cuban productivity growth did not continue. Apparently, with the Cuban leadership mostly unchanged, the recovery of

[30] In all countries which highly subsidized agricultural production under the Communist regime, removing these distortions implied that output declined, and remained lower, even when productivity increased significantly (Macours & Swinnen, 2002) (see Figure 11).

[31] See also Swinnen (2009).

productivity to pre-reform levels reduced the pressure to continue (or even maintain) reform efforts. Instead, there was a reversal in economic policy. The restructuring of the sugar industry and dramatic weather conditions contributed to the fall in output in the mid-2000s.

The performance since 2004 is disappointing: ALP and yields have fluctuated over the past decade but are roughly at the same levels as they were a decade ago: ALP in 2012 is still below the 2004 level (and below the 1989 level) while average yields are just marginally higher. There has been a lost decade in terms of productivity growth.

This contrasts strongly with the performance of agriculture in Central Europe and the Baltics – and even Russia. In all these regions, productivity growth has been strong over the 2004-2012 period (Figure 11). In the Baltics – the transition region which resembled Cuba in terms of agricultural productivity change over the 1990-2004 period, a commitment to economic reforms and international integration by democratically elected governments – and the integration in the EU – led to significant continuous growth in productivity. Cuba contrasted with all these elements. The political regime and economic choices were very different, and this is reflected in a much poorer performance since 2004.

Future developments

It is difficult to predict what will happen in the coming years. The output and productivity indicators can be interpreted in different ways. A pessimistic interpretation of the data is that (a) the decline in 2005 and 2006 was a temporary drop caused by bad weather and (b) that the reforms since have had limited effects and merely stabilized productivity and output, rather than creating much growth since both GAO and ALP in 2012 are still below the 2004 level.

A more optimistic interpretation is that the reversals to more state regulation in the 2003-2006 period caused a decline of productivity and output in 2005-2006, but that policy

reforms since (such as the increase in farm prices in 2007 and 2008, and land reform and market liberalization since 2008) have reversed this decline and induced a new process of growth in productivity (reflected in increasing ALP since 2007). In fact, the average annual ALP growth between 2006 and 2012 was 4.6%.

Other data are limited but what is available also suggests significant changes in the agricultural production and marketing system. There has been a substantial increase in private sector land use, production and sales in recent years. Data on land use by farm type in Figure 15 shows that the share of agricultural land used by Cooperatives of Credit and Services (CCSs)[32] and private farmers has increased significantly in recent years: from 18% in 2007 to 36% in 2013. This number is likely to increase further but is already much closer to the predicted share of individual farming in Cuba based on the relationships in Figure 14. The growth in land used by private farmers and CCSs is mostly from idle state land and land used by other types of cooperatives (in particular UBPCs) before since. Land used by state farms has been relatively constant since 1995 (around 30%).

As in other transition countries, despite reports of poor land quality allocated to private farms, the share of the private sector in agricultural production is considerably higher than its share in land use – and that of the state farms and the UBPCs considerably lower. The share of state farms in agricultural production has decreased from 67% in 1989 to 15% in 2011 while the role of CCSs and private farmers in total agricultural production has increased from 58% in 2006 to 70% in 2011 (Figure 16).[33]

[32] The non-state agricultural sector consists of three different production entities: Basic Units of Cooperative Production (UBPCs), Agricultural Production Cooperatives (CPAs) and Credit and Services Cooperatives (CCSs). The latter have the highest degree of independence from the state and data on their performance is often reported together with private farmers.

[33] Note that the fact that only land use rights are given to households should not limit significant productivity growth, as this was also the case in e.g. China (Swinnen, 1999).

While the private farms and the CCSs are obliged to sell a share of their production (up to 70%) to the state procurement agency, *acopio*[34] (Gayoso, 2009), the share of free markets and kiosks has increased significantly in recent years: from around 5% in 2008 to 45% in 2013 (Figure 17).[35]

In summary, these indicators do suggest that many changes have occurred since 2008 and that the "optimistic scenario" is more likely with productivity growth driven by structural changes and reforms.

5. Conclusion

In this paper, we have shown that Cuba does not fit easily in one of the transition patterns, and, in a way, has characteristics of "a bit of everything". For example, the collapse of the CMEA and the Former Soviet Union had a very severe impact on the Cuban economy. GDP fell by 25% and key imports and exports fell even more. This is very similar to the countries in Eastern Europe where economic growth and output collapsed in the 1990s. Yet, unlike Central and Eastern European countries, there was no attempt to reform the autocratic political system towards more democracy. In this way, Cuba followed the "Asian" pattern where several regimes (both in Central and Eastern Asia) allowed economic liberalization while holding on the political control – best documented in China.

However, unlike China, agricultural reforms have been much less radical and slower and the economic liberalization process has not continued. Instead, it is characterized by periods of reversal. In particular, in the mid-2000s, a series of new regulations were put in place

[34] They also need to be linked to entities closely supervised by the state (UBPCs and CPAs) to acquire inputs (Mesa-Lago & Perez-Lopez, 2013).

[35] Also the fact that a quota needs to be sold to state procurement systems is similar to China in the early transition stages (Rozelle, 1996; Rozelle & Swinnen, 2004).

which reversed the trend of increasing policies of liberalization experienced in the previous decade. These reversals have caused a slowdown or even negative productivity growth.

Since Raul Castro became president in 2008, a new process of economic transformation, identified as "update of the economic model", was introduced and several new economic reforms were announced. There is clearly a need to get better indicators and information on the implementation of the recent reforms and their effects. However the data that is available suggests that significant productivity growth has resumed since 2008 following recent reforms.

It should also be emphasized that Cuba has achieved a remarkable high level of food security – certainly compared to other countries of similar income levels. Part of this is due to its spending on health and education, in combination with subsidized food. However, the *acopio* system of food distribution has implied several inefficiencies and the budgetary outlays have become increasingly unsustainable. As a consequence, some of the food subsidies have already been removed in recent years.

Obviously many restrictions remain, and these many constrain future growth. For example, Gonzalez (2011), Hagelberg (2011) and Mesa-Lago & Perez-Lopez (2013) point out at the continued involvement of the state in production, sales, and price decisions, that land use rights are temporary only, etc.

One important constraint on the future development of the Cuban agricultural and food system is the absence of stable private sector investment and initiatives along the value chain. Investments in the up- and downstream segments of the value chains have played a key role in enhancing productivity, quality, technology upgrading and improved access to inputs and credit along the value chain, including for farms, in many transition countries (Gow & Swinnen, 1998; Dries & Swinnen, 2004, 2010). Restrictions for investments in this area are likely to

hurt farmers and consumers at least as much than regulations and restrictions at the farm and consumer level.[36]

[36] Unfortunately no official FDI data is available but Feinberg (2012) provides anecdotal evidence on the scarce investments that have taken place. Evidence suggests that the inflow of Foreign Direct Investments (FDI) in the economy has fluctuated with the reform cycles identified in Section 3 but that the general level has remained low. While restrictions have been officially relaxed in 2014, several hurdles remain. In the agricultural sector, reports mention recent agreements with a Brazilian company to run a large sugar mill (The Economist, 2012).

6. References

Alvarez, J. (2004a). The Issue of Food Security in Cuba. University of Florida, EDIS-IFAS Fact Sheets, FE483.

Alvarez, J. (2004b). Overview of Cuba's Food Rationing System. University of Florida, EDIS-IFAS Fact Sheets, FE482.

Alvarez, J., & Perez-Lopez, J. (2006). The Restructuring of Cuba's Sugar Agro-industry: Impact on Rural Landscape and Communities. *Journal of Rural and Community Development*, 2(1).

Carter, A. (2013). Cuba's Food Rationing System and Alternatives. Case Study #4-6 of the Program "Food Policy for Developming Coutrnies: the role of Government in the Global Food Supply System", Cornell University, Ithaca.

Castañeda, R. (2011). Cuba: la Baja Productividad y los Ajustes Socio-economics de 2010-2011. *Cuba in Transition - Association for the study of the Cuban Economy*, Volume 21.

Castañeda, R. (2013). Critica a las Reformas Raulistas, 2006-2013. *Cuba in Transition - Association for the study of the Cuban Economy*, Volume 23.

Chaguaceda, A. & Geoffray M-L. (2013). Las Reformas en Cuba: Que Sigue, Que Cambia, Que Falta, *Cuba in Transition - Association for the Study of the Cuban Economy*, Volume 23.

CIA (Central Intelligence Agency) (1990). *The World Fact Book.* Washington: Government Printing Office.

Dries, L., & Swinnen, J. (2004). Foreign Direct Investment, Vertical Integration, and Local Suppliers: Evidence from the Polish Dairy Sector. *World development*, *32*(9), 1525-1544.

Dries, L., & Swinnen, J. (2010). The Impact of Interfirm Relationships on Investment: Evidence from the Polish Dairy Sector. *Food policy*, *35*(2), 121-129.

FAO (Food and Agriculture Organization of the United Nations) (2014). FAOSTAT Database. Retrieved December 2014, from http://faostat.fao.org

Feinberg, R. (2012). The New Cuban Economy – What Role for Foreign Investment? Brookings Latin America Initiative.

Franck, M. (2004). Cuba's New Growth Rate Fails to Cure Old Problems, The Financial Times. January 4, 2004, Accessed September 2014.

Franco, M., Orduñez, P., Caballero, B., Granados, J., Lazo, M., Bernal, J., & Cooper, R. (2007). Impact of Energy Intake, Physical Activity, and Population-wide Weight Loss on

Cardiovascular Disease and Diabetes Mortality in Cuba, 1980–2005. *American Journal of Epidemiology*, 166(12), 1374-1380.

Gayoso, A. (2009). The art of doing nothing: Agricultural Policy Making in Cuba. *Cuba in Transition - Association for the study of the Cuban Economy,* Volume 19.

Gonzalez-Corzo, M. (2011). Update on Cuba's non-Sugar Agricultural Sector. *Cuba in Transition - Association for the study of the Cuban Economy,* Volume 21.

Gonzalez-Corzo, M., & Nova, A. (2013). US Agricultural Exports to Cuba: Composition, Trends, and Prospects for the Future. *Choices Magazine*, 28(4), 1-6.

Gow, H. & Swinnen, J. (1998). Agribusiness Restructuring, Foreign Direct Investment, and Hold-Up Problems in Agricultural Transition. *European Review of Agricultural Economics*, 25(4):331-350.

Hagelberg, G., & Alvarez, J. (2006). Historical Overview of Cuba's Costs of Sugar Production 1959-2005. University of Florida, EDIS-IFAS Fact Sheets, FE626.

Hagelberg, G., & Alvarez, J. (2007). Cuba's Dysfuncitonal Agriculture: the Challenge Facing the Government. *Cuba in Transition - Association for the Study of the Cuban Economy,* Volume 17.

Hagelberg, G. & Alvarez, J. (2009). Cuban Agriculture: The Return of the Campesinado. *Cuba in Transition - Association for the Study of the Cuban Economy,* Volume 19.

Hagelberg, G. (2011). Agriculture Policy and Performance. *Cuba in Transition - Association for the Study of the Cuban Economy*, Volume 21.

Herrera Sorzano, A., Gonzalez Sousa, R.& Marmol Fundora E. (2012). Cuba: Modificaciones en la Tenencia de la Tierra y el Desarrollo de la Agricultura Urbana: Avances en Seguridad Alimentaria. Facultad de Geografía, Universidad de La Habana, unpublished manuscript.

Huang, J., & Rozelle, S. (1996). Technological Change: Rediscovering the Engine of Productivity Growth in China's Rural Economy. *Journal of Development Economics, 49(2), 337-369.*

Koont, S. (2009). The Urban Agriculture of Havana. *Monthly Review,* 60(1), 63-72.

IFPRI (International Food Policy Research Institute). (2014) The Global Hunger Index. The Challenge of Hidden Hunger. October 2014. IFPRI, Welthungerhilfe, and Concern Worldwide.

ILO (International Labor Organization). (2010). ILOSTAT Database. Retrieved December 2014, from http://labourstat.ilo.org/

Lansberg-Rodriguez, D. (2014). Cuba's Christmas Surprise for Caracas. *Foreign Policy,* December 18, 2014. Retrieved December, 22, 2014 from *http://foreignpolicy.com/2014/12/18/cubas-christmas-surprise-for-caracas/*

Macours, K., & Swinnen, J. (2000). Causes of output decline in economic transition: The case of Central and Eastern European agriculture. *Journal of Comparative Economics*, 28(1), 172-206.

Macours, K. & Swinnen, J. (2002). Patterns of Agrarian Transition. *Economic Development and Cultural Change*, 50(2): 365-394.

The Maddison-Project (2013). http://www.ggdc.net/maddison/maddison-project/home.htm, 2013 version.

Marrero, L. (1982). *Cuba: Economía y Sociedad.* Editorial San Juan.

Mathijs, E., & Swinnen, J. (1998). The Economics of Agricultural Decollectivization in East Central Europe and the Former Soviet Union. *Economic Development and Cultural Change, 47(1), 1-26.*

Mathijs, E., & Swinnen, J. (2001). Production Organization and Efficiency during Transition: An Empirical Analysis of East German Agriculture. *Review of Economics and Statistics, 83(1), 100-107.*

Mesa-Lago, C. (2006). Es Viable Terminar con Medio Siglo de Racionamiento en Cuba ? *Revista Vitral*, n°74, año XIII.

Mesa-Lago, C. (2007). The Cuban Economy in 2006-2007. *Cuba in Transition - Association for the Study of the Cuban Economy*, Volume 17.

Mesa-Lago, C. (2013). Panorama de las Reformas Economico-Sociales y Sus Efectos en Cuba. *Cuba in Transition - Association for the Study of the Cuban Economy*, Volume 23.

Mesa-Lago, C. (2014). Institutional Changes of Cuba's Economic Social Reforms. University of Pittsburg, Bookings Institution.

Mesa-Lago, C., & Perez-Lopez, J. (2013). *Cuba Under Raúl Castro: Assessing the Reforms*, Lynne Rienner Publishers, London.

Messina, W. (2009). Agricultural Reform in Cuba: Implications for Agricultural Production, Markets and Trade. *Food and Resource Economics Department, Institute of Food and Agricultural Sciences, FE159.*

Molina, J. M. (2005). *La Economia Cubana Desde el Siglo XVI a XX: del Colonialismo al Socialismo de Mercado.* CEPAL, Unidad de Desarrollo Económico - SERIE Estudios y perspectivas, Mexico.

Nova, A. (1998). Nuevas Relaciones de Producción en la Agricultura. Paper Presented at the XXI Congress of the Latin American Studies Association (October 1998).

Nova, A. (2000). El Mercado Interno y el Acceso a los Alimentos en Cuba. Centro de Estudios de la Economía Cubana, Universidad de la Habana, Ciudad de la Habana. Mimeo.

Nova, A. (2008). El Sector Agropecuario en Cuba. *Nueva Sociedad*, 216, 77-89.

Nova, A. (2012). Cuban Agriculture and the Current Economic Transformation Process. *From the Island Cuba Study Group*, Issue 9.

ONEI (Oficina Nacional de Estadisticas e Informacion). (2012). Panorama Economico y Social: Cuba 2011. Retrieved June 2014, from http://www.one.cu/publicaciones/08informacion/panorama2011/19%20Presupuesto.pdf

ONEI (Oficina Nacional de Estadisticas e Informacion). (2014a). Anuario Estadistico de Cuba, various years. Retrieved December 2014, from http://www.one.cu/aec2012/20080618index.htm

ONEI (Oficina Nacional de Estadisticas e Informacion). (2014b). Ventas en el Mercado Agropecuario, various years, Publicaciones Trimestrales.

ONEI (Oficina Nacional de Estadisticas e Informacion). (2014c). Ventas de Productos Agropecuarios, various years, Publicaciones Trimestrales.

Pastor, M., & Zimbalist, A. (1995). Waiting for Change: Adjustment and Reform in Cuba. *World Development , 23*(5), 705-720.

Perez, E.O., & Vidal, P. (2010). Cuba's Economy: A Current Evaluation and Several Necessary Proposals. *Socialism and Democracy*, 24(1), 71-93.

Perez-Lopez, J. (2002). The Cuban Economy in an Unending Special Period. *Cuba in Transition, Association for the study of the Cuban Economy*, Volume 12.

Perez-Lopez, J. (2006). The Cuban Economy in 2005-2006, the End of the Special Period? *Cuba in Transition - Association for the study of the Cuban Economy*, Volume 16.

Perez-Lopez, J. & Mesa-Lago, C. (2009). Cuban GDP Statistics under the Special Perdiod: Discontinuities, Obfuscation and Puzzles. *Cuba in Transition - Association for the study of the Cuban Economy*, Volume 19.

Pujol, J. (2011). Main Problems Faced by the Cuban Economy and What the Government is Doing to Try to Solve Them. *Cuba in Transition, Association for the study of the Cuban Economy*¸Volume 21.

Rodriguez, J-L. (1992). La Economía Cubana ante la Cambiante Coyuntura Internacional, Boletín de Información Sobre la Economía Cubana, No 1, Vol. 1, La Habana.

Rozelle, S. (1996). Gradual Reform and Institutional Development: The Keys to Success of China's Agricultural Reforms. In McMillan, J. & Naughton, B. (eds). *Reforming Asian Socialism: The Growth of Market Institutions*. University of Michigan Press.

Rozelle, S. & Swinnen, J. (2004). Success and Failure of Reform: Insights from the Transition of Agriculture. *Journal of Economic Literature*, 42(2), 404-456.

Swinnen, J. (1999). The political economy of land reform choices in Central and Eastern Europe. *Economics of Transition*, 7(3), 637-664.

Swinnen, J. (2009). Reforms, Globalization, and Endogenous Agricultural Structures. *Agricultural Economics*, 40(s1), 719-732.

Swinnen, J., Dries, L., Macours, K. (2005). Transition and Agricultural Labour. *Agricultural Economics*, 32 (1), 15–34.

Swinnen, J., & Rozelle, S. (2006). *From Marx and Mao to the Market: the Economics and Politics of Agricultural Transition*. Oxford Univeristy Press.

Swinnen, J., Vandeplas, A., & Maertens, M. (2010). Liberalization, Endogenous Institutions, and Growth: a Comparative Analysis of Agricultural Reforms in Africa, Asia, and Europe. *The World Bank Economic Review*, 24(3), 412-445.

The Economist (2012). Special Report on Cuba: Edgigng towards Capitalism. *The Economist - Print Edition, 24 March*.

Torres, R., Nelson, V., Momsen, J., & Niemeier, D. (2010). Experiment or Transition? Revisiting Food Distribution in Cuban Agromercados from the 'Special Period'. *Journal of Latin American Geography*, 9 (1).

UNCTAD (United Nations Conference on Trade and Development) (2014). UNCTAD STAT Database. Retrieved January 2015, from http://unctad.org/en/Pages/Statistics.aspx

UNDP (United Nations Development Program) (2010). Cuba, Objetivos de Desarrollo del Milenio, Tercer Informe. MDG Country Progress Reports.

USDA (United States Department of Agriculture). (2008). Cuba's Food & Agriculture Situation Report. Washington: United States Department of Agriculture, Foreign Agricultural Services.

USDA (United States Department of Agriculture). (2014). Global Agricultural Trade System (GATS) Online. Available online: http://www.fas.usda.gov/ gats/default.aspx

USITC (United States International Trade Commission) (2007). Agricultural Sales to Cuba: Certain Economic Effects of U.S. Restrictions, Investigation No. 332-489.

Vidal, P. (2007). La Inflacion y el Salario Real: 1989-2006. Interpress Service in Cuba.

WHO (World Health Organization) (2014). Cuba Country Brief, Country Cooperation Strategy at a glance.

World Bank. (2014). World Development Indicators - Cuba. Retrieved December 2014, from http://data.worldbank.org/country/cuba

Wright, J. (2008). *Sustainable Agriculture and Food Security in an Era of Oil Scarcity - Lessons from Cuba*. EarthScan.

Zepeda, L. (2003). Cuban Agriculture, a Green and Red Revolution. Choices Magazine, 18(4), 1-4.

7. Tables and Figures

Table 1. Selected initial condition indicators for immediate pre-reform period in transition countries[*]

	Share of agr. in empl. (%)	GNP/capita (PPP$ 1989)	Labour/land (Pers./ha)	Agr. land in indiv. farms (%)	CMEA export (% of GDP)	Years central planning
Cuba	19.1	2000[**]	0.220	14	24	30
China	69.8	800	0.672	5-10	01	42
Russia	12.9	7720	0.044	2	13	74
Baltics ($\bar{X}$)	15.4	7973	0.085	6	31	51
Central Europe ($\bar{X}$)	16.6	7040	0.163	21	12	42

Note: [*] The Baltics include Estonia, Latvia and Lithuania. Central Europe includes the Czech Republic, Hungary, Poland and Slovakia. Regional figures are averages of each of the countries included in the region. Pre-reform indicators are from 1978 for China, 1989 for Central European countries and Cuba and 1990 for Russia and the Baltics.

[**] CIA (1990) estimates. The Maddison-Project reports a GDP/capita of 2991 US$ in 1989 (1990 international prices). We use the latter source in figures 18 & 19.

Source: Macours & Swinnen (2002) and own calculations based on data from CIA (1990), Molina (2005), FAO (2014) and World Bank (2014)

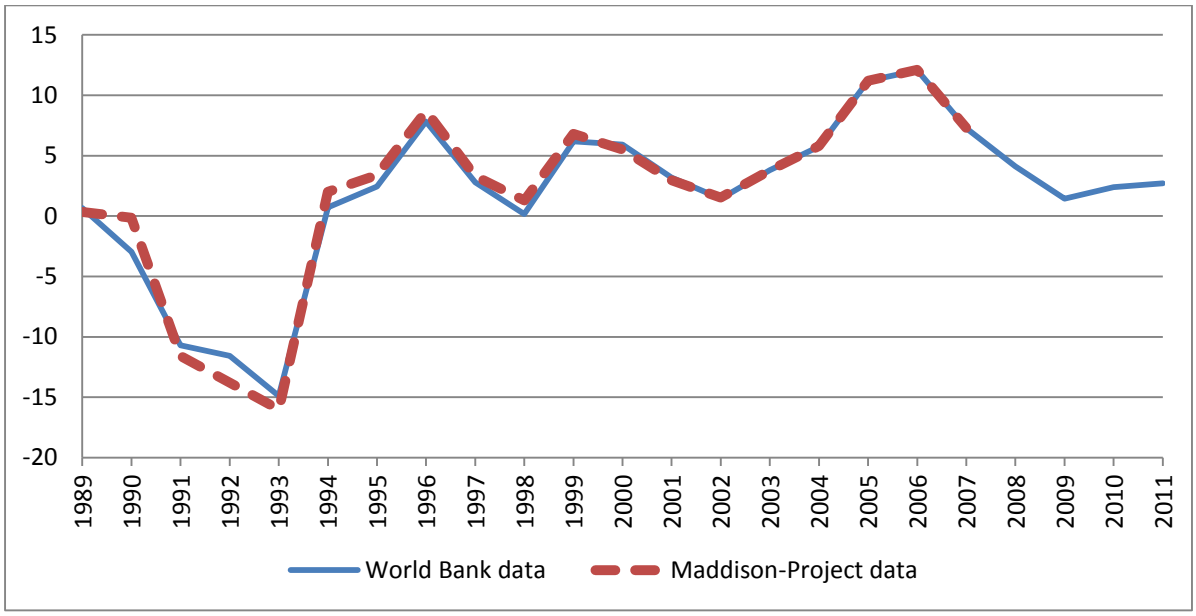
Table 2. Land transfers to individual farmers and cooperatives (2008-2012)

	# of usufructuaries	Ha distributed	% of it cultivated
March 2009	56,000	560,751	33% (end 2009)
June 2010	111,715	1 million	
May 2011	146,000	1 million	
October 2011	147,000	1.2 million	46-72% (end 2011)
December 2012	174,000	1.5 million	45-67% (end 2012)

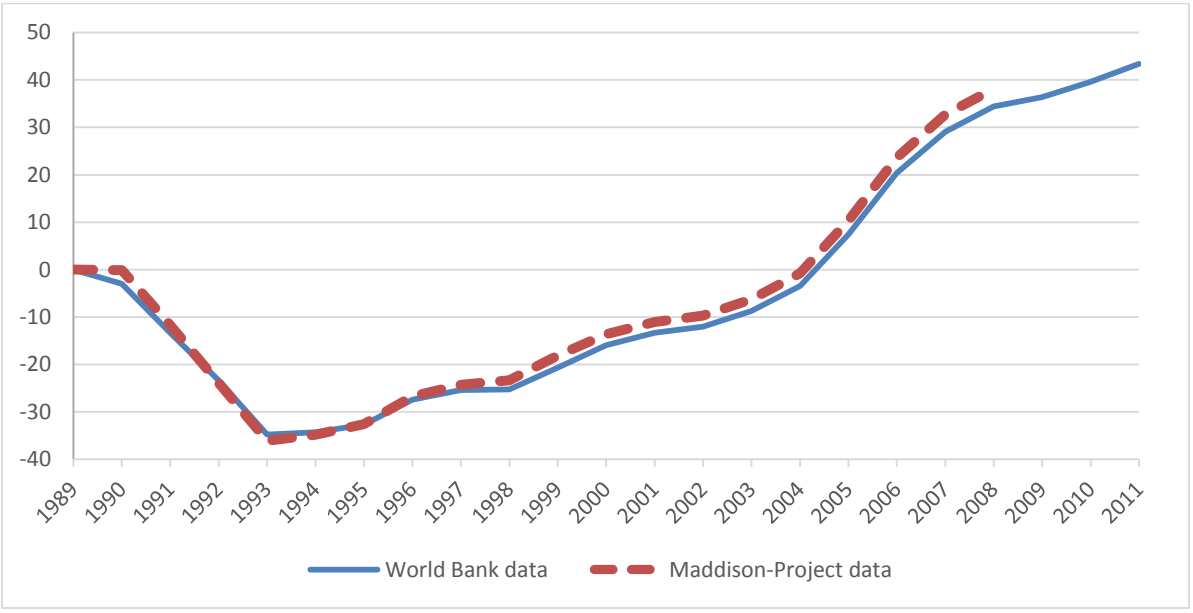
Source: Mesa-Lago & Perez-Lopez (2013)

Figure 1. Evolution of Cuban GDP (1989-2011) [37]

1a. Annual GDP growth (%)



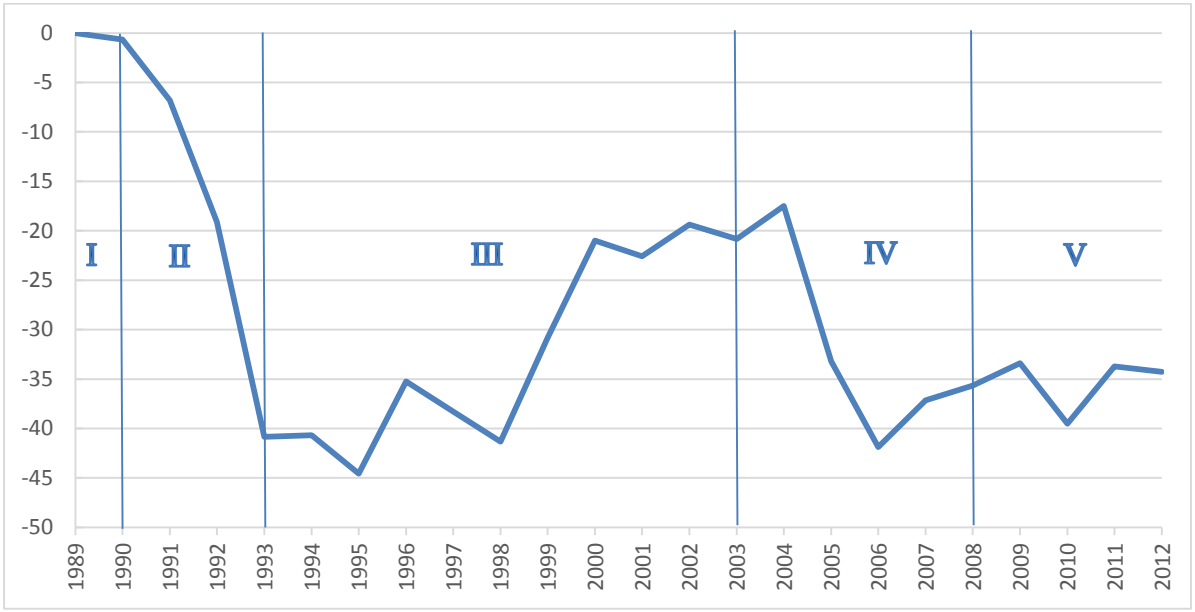
1b. Real GDP index (1989=0)



Source: World Bank (2014) & The Maddison-Project (2013)

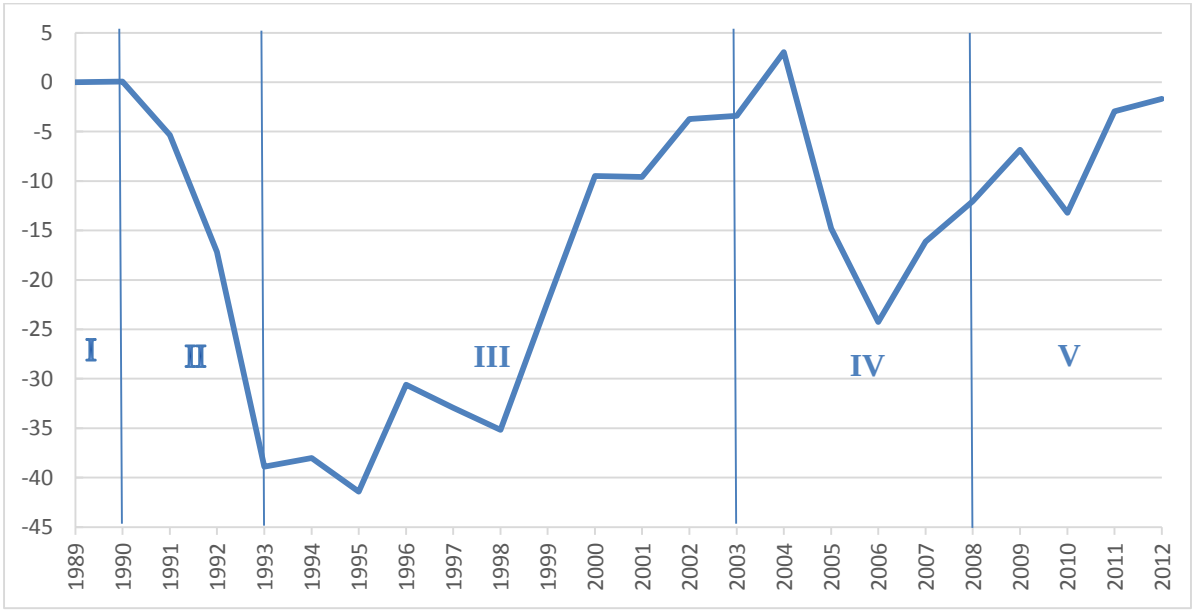
[37] Official GDP statistics should be taken with caution. See footnote 18 for more details.

Figure 2. Gross agricultural output index (1989=0) (1989-2012)



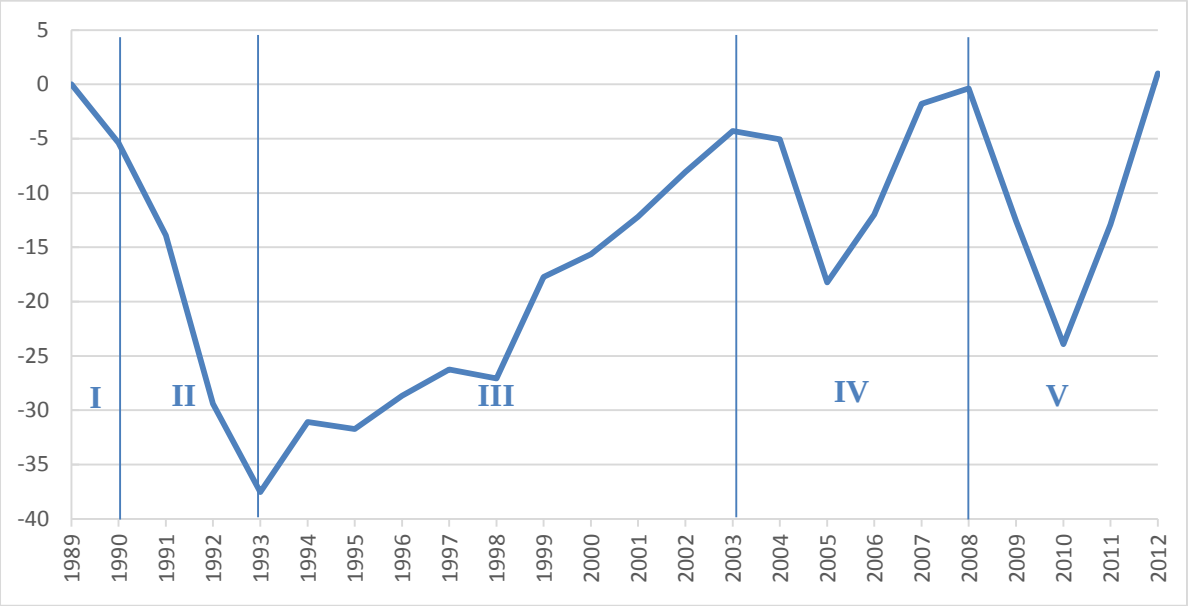
Source: Own calculations based on data from FAO (2014)

Figure 3. Agricultural labour productivity index (1989=0) (1989-2012)



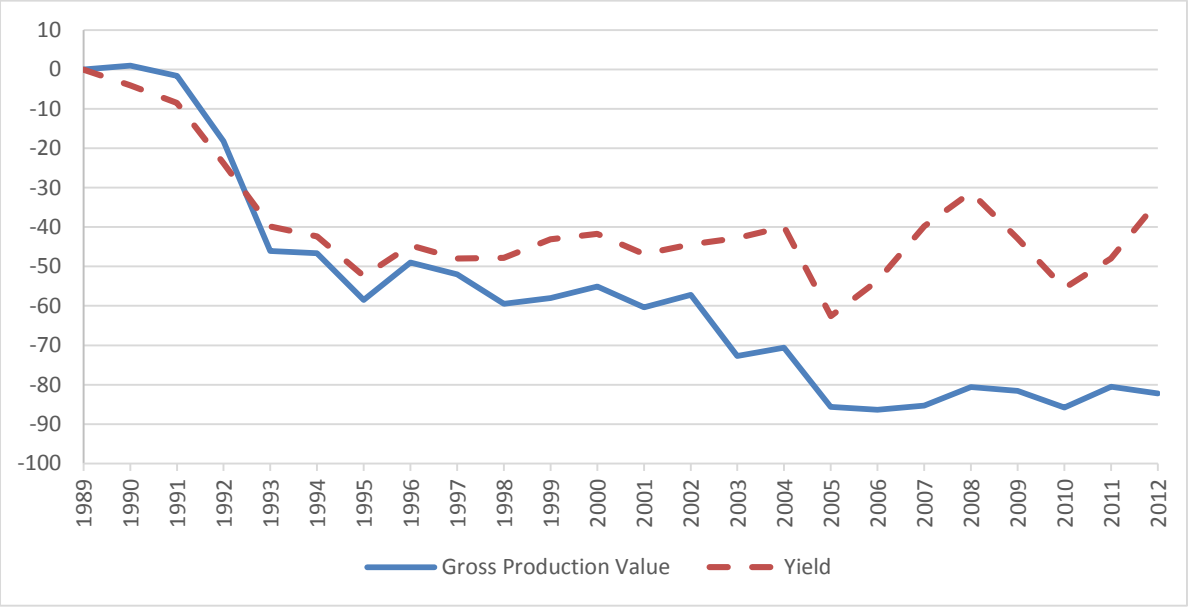
Source: Own calculations based on data from FAO (2014)

Figure 4. Average agricultural yield index (1989=0) (1989-2012)



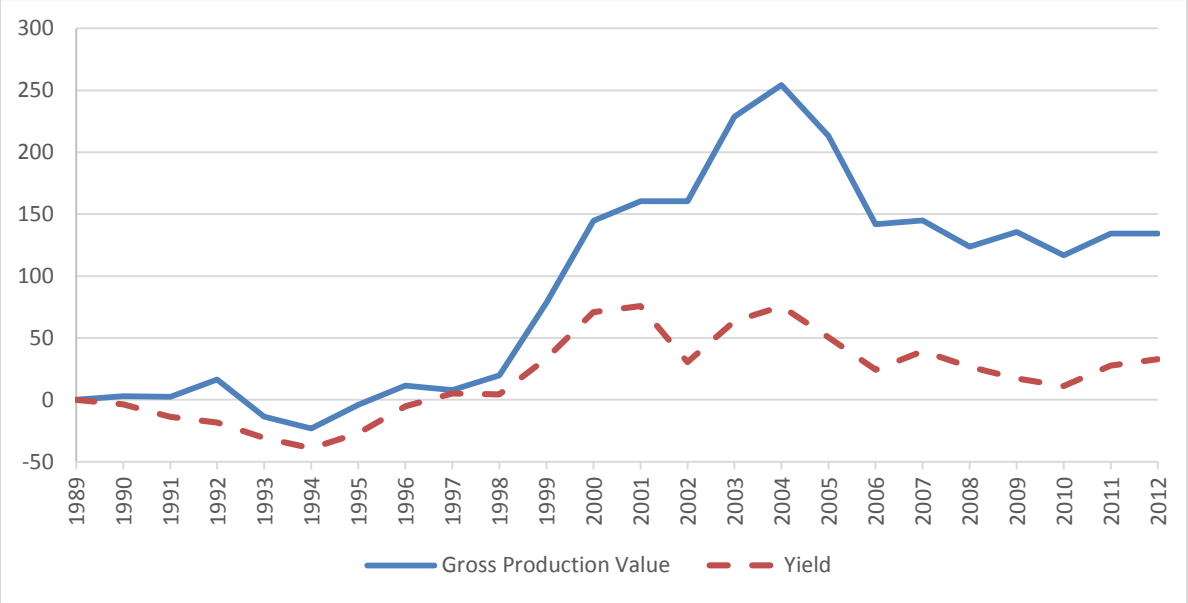
Source: Own calculations based on data from FAO (2014)

Figure 5. Sugar cane: production and yields indices (1989=0) (1989-2011)



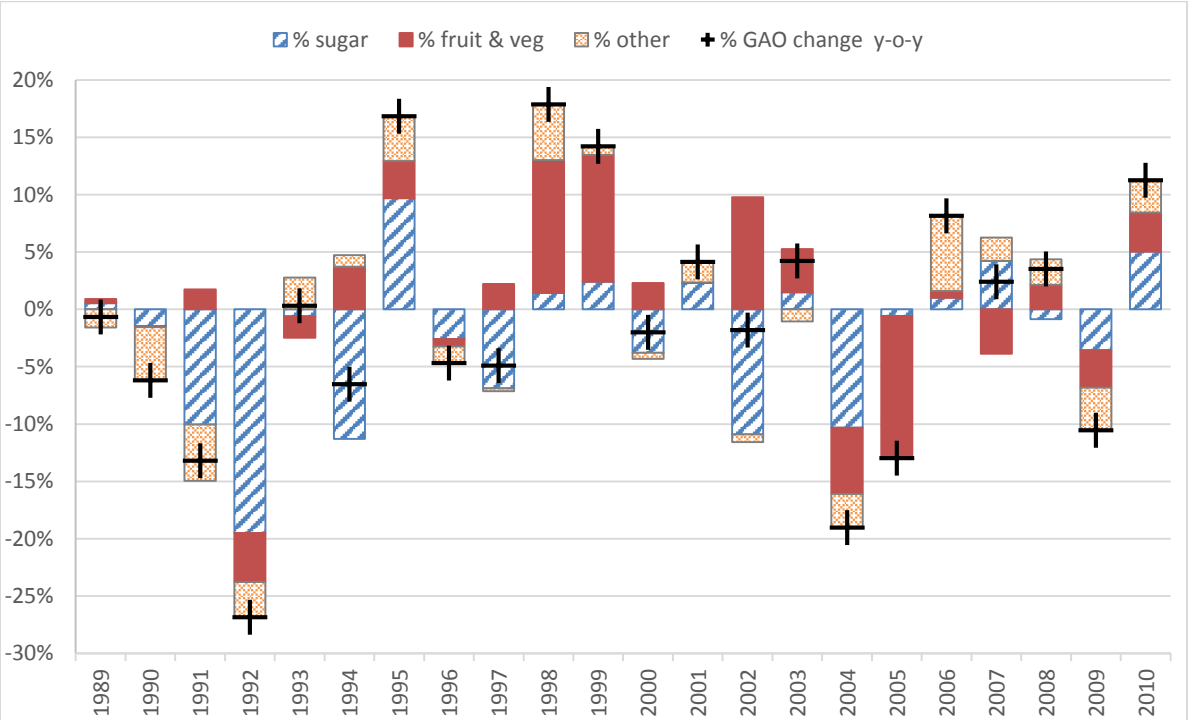
Source: Own calculations based on data from FAO (2014)

Figure 6. Fruit and vegetables: production and yields indices (1989=0) (1989-2011)



Source: Own calculations based on data from FAO (2014)

Figure 7. Decomposition of GAO year on year growth by commodity[38] (1989-2010)[*]



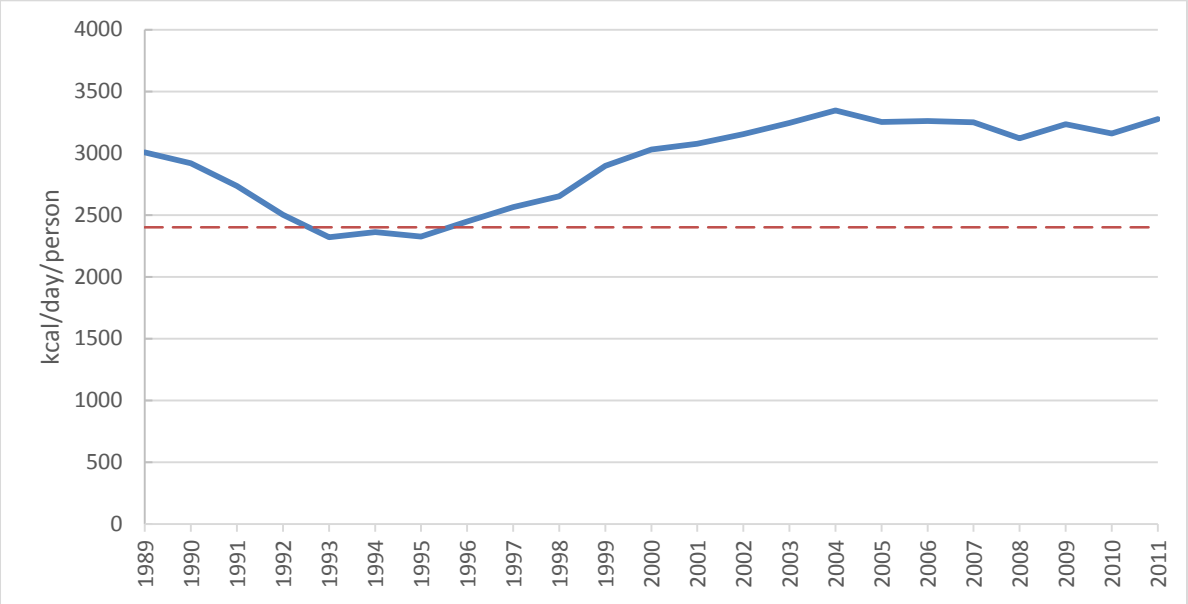
[*] The category 'other' is computed as the difference between total GAO, sugar and fruit & vegetables output.

Source: Own calculations based on data from FAO (2014)

[38] For more details see Table A2 in Appendix.

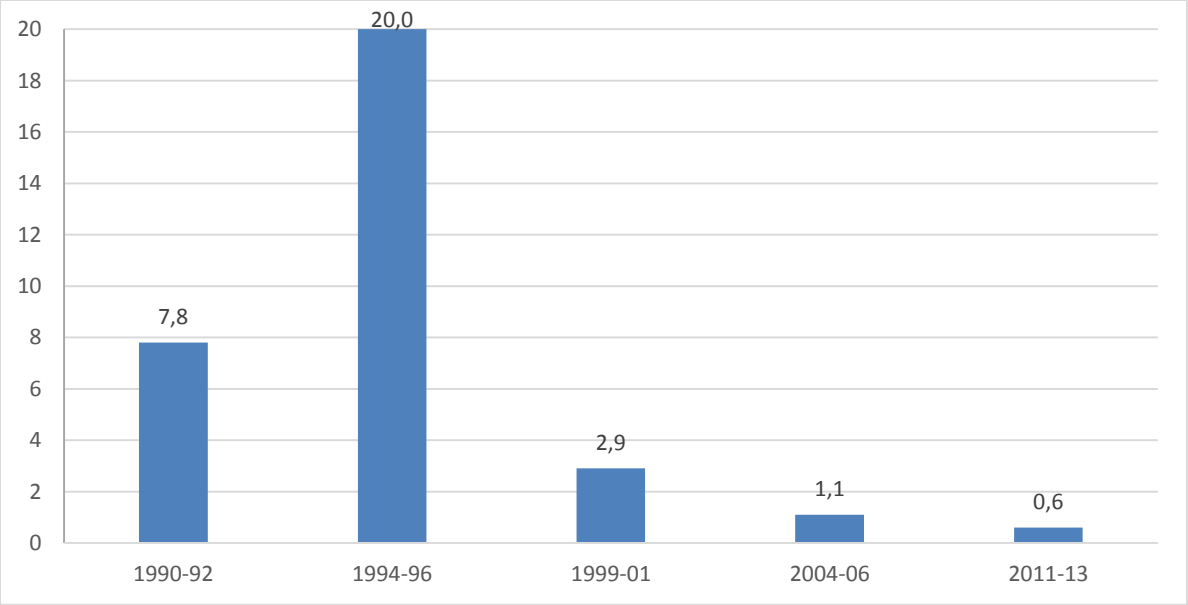
Figure 8. Food security indicators

8a. Food availability (average calories per capita per day) (1989-2011)*



* The dotted line represents the minimum daily nutritional requirements for Cuba.

8b. Prevalence of undernourishment (% of population)**

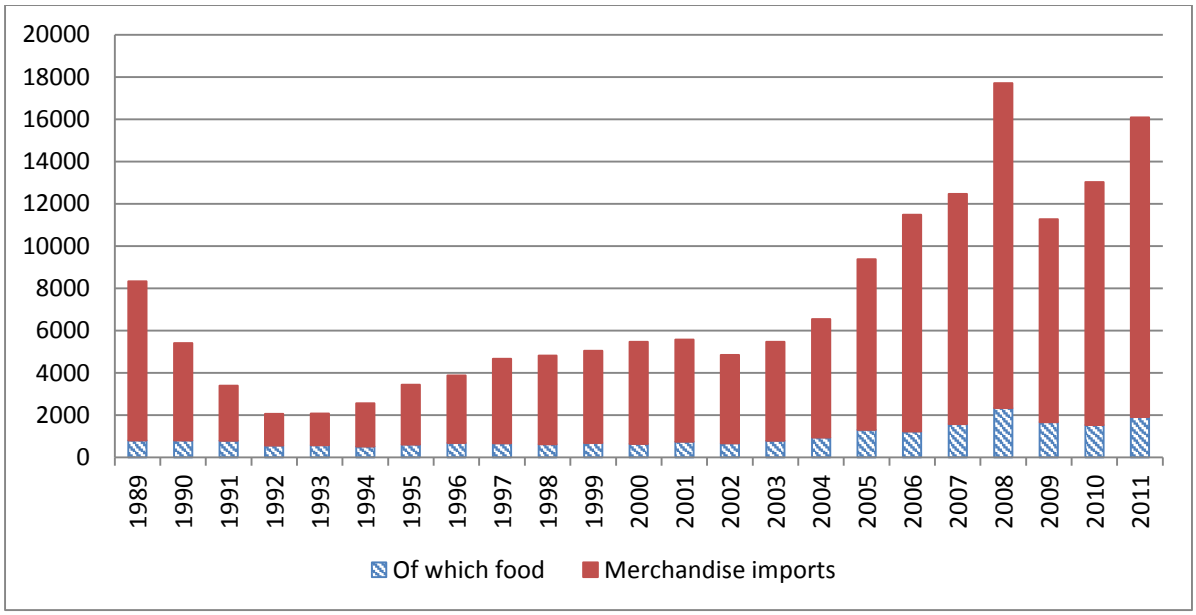


** The prevalence of undernourishment expresses the probability that a randomly selected individual from the population consumes an amount of calories that is insufficient to cover her/his energy requirement for an active and healthy life. The indicator is computed by comparing a probability distribution of habitual daily Dietary Energy Consumption with a threshold level (the Minimum Dietary Energy Requirement) (FAO, 2014).

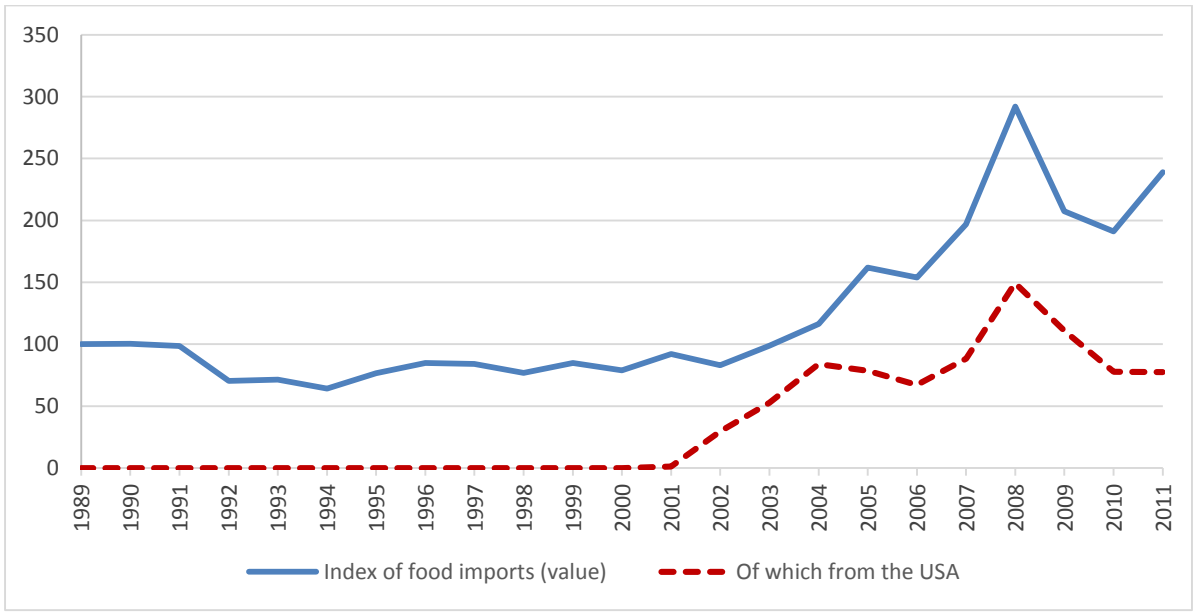
Source: FAO (2014) & IFPRI (2014)

Figure 9. Cuban food and merchandise imports (1989-2011)

9a. Merchandise imports (Million US$)

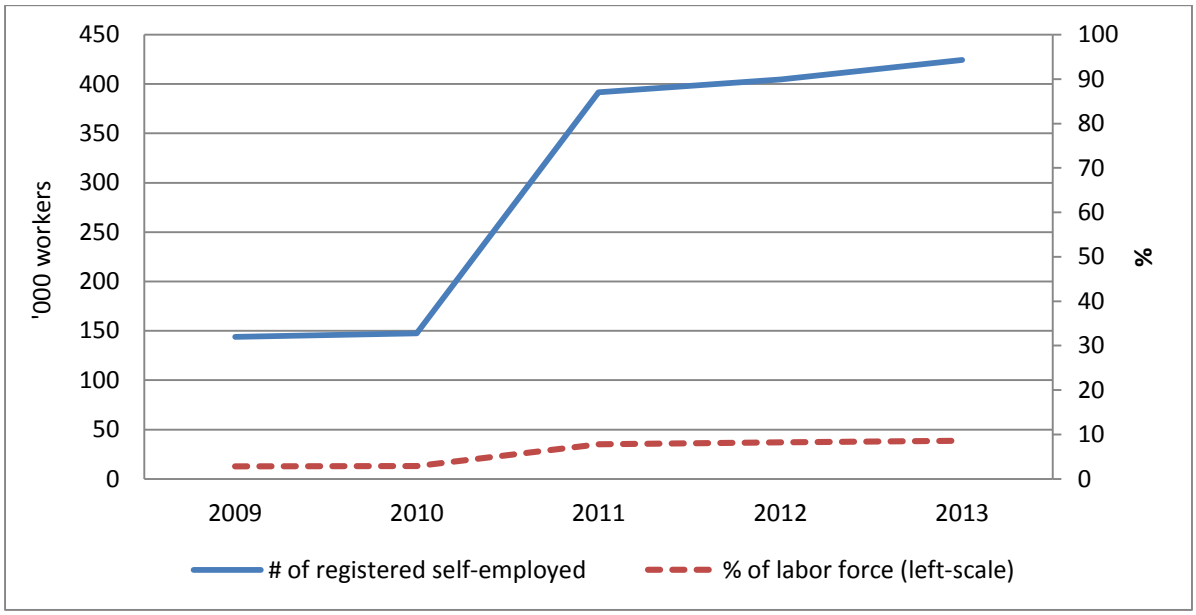


9b. Index of food imports: total and from the USA (1989=100)



Source: Own calculations based on data from USDA, UNCTAD & FAO (2014)

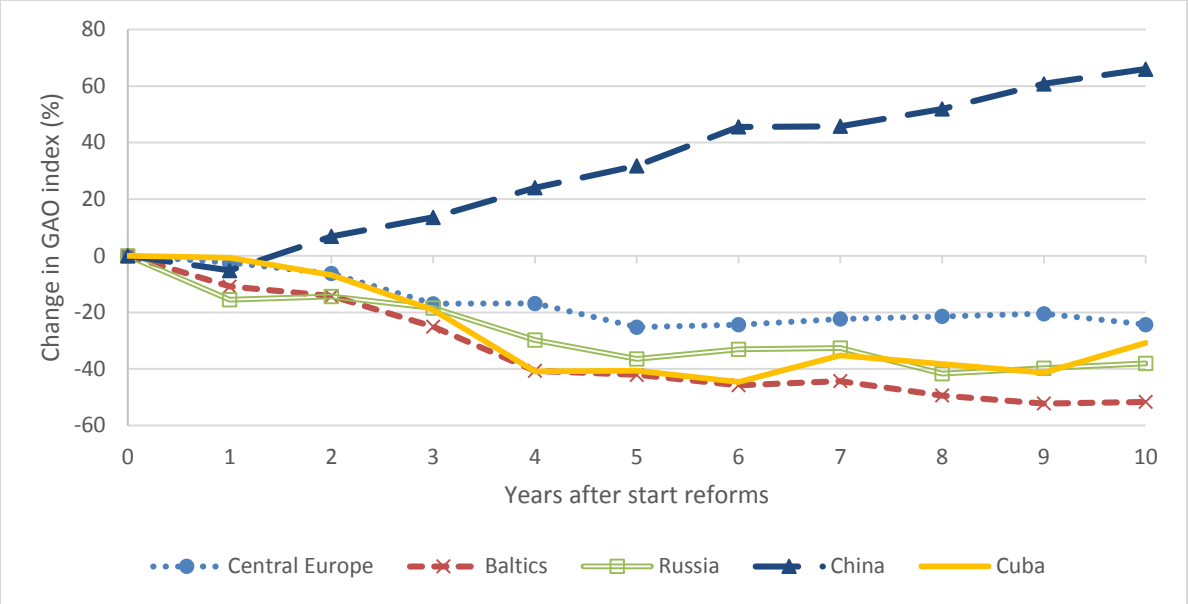
Figure 10. Self-employment (2009-2013)



Source: ONEI (2014a)

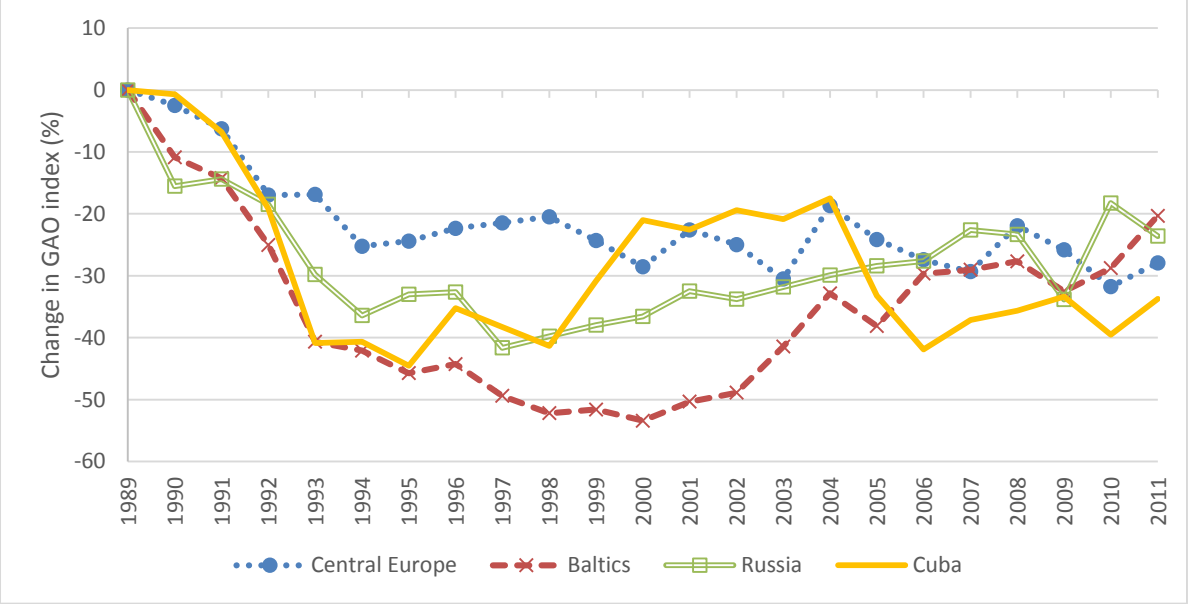
Figure 11. Change in gross agricultural output in transition countries (1989=0) (%)

11 a. First 10 years of transition (including China)*



* The year 0 of the transition is 1979 in China, 1989 in the other countries and regions. The Baltics include Estonia, Latvia and Lithuania. Central Europe includes the Czech Republic, Hungary, Poland and Slovakia. Figures are averages of each of the countries included in the region.

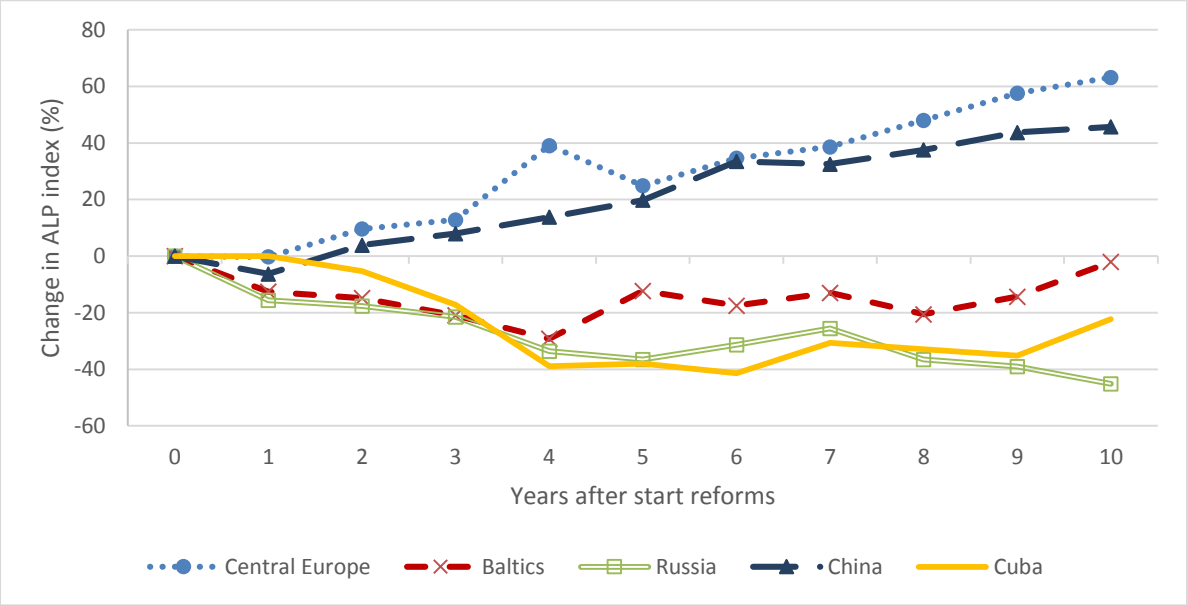
11b. Period 1989-2011 (excluding China)



Source: Own calculations based on Swinnen & Rozelle (2006) and data from FAO (2014)

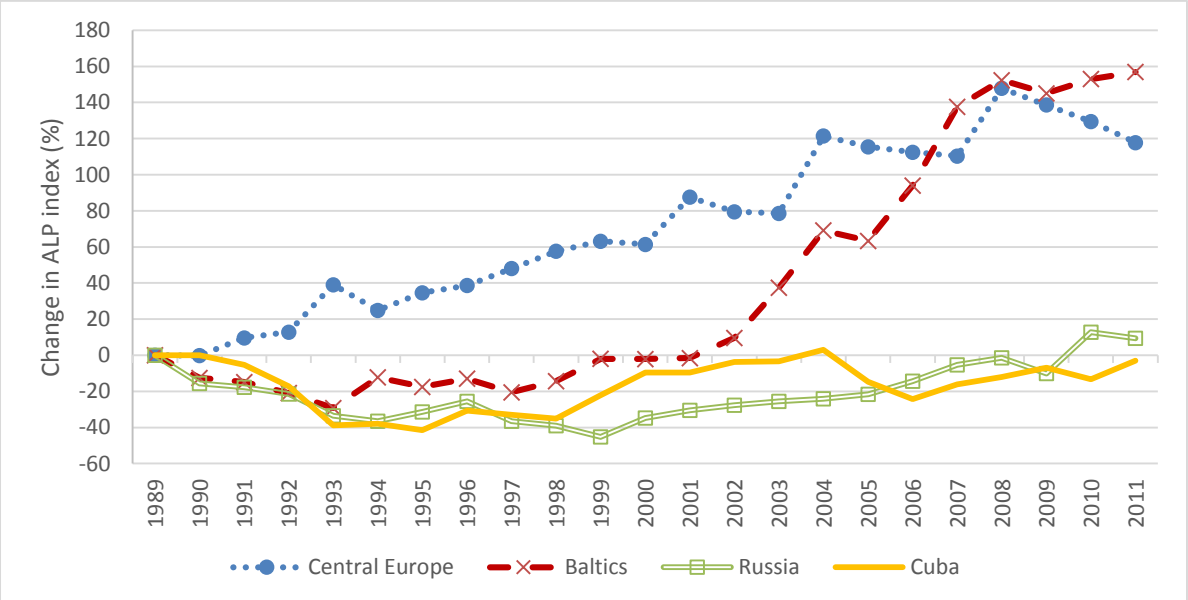
Figure 12. Change in agricultural labor productivity in transition countries (1989=0) (%)

Figure 12a. First 10 years of transition (including China)*



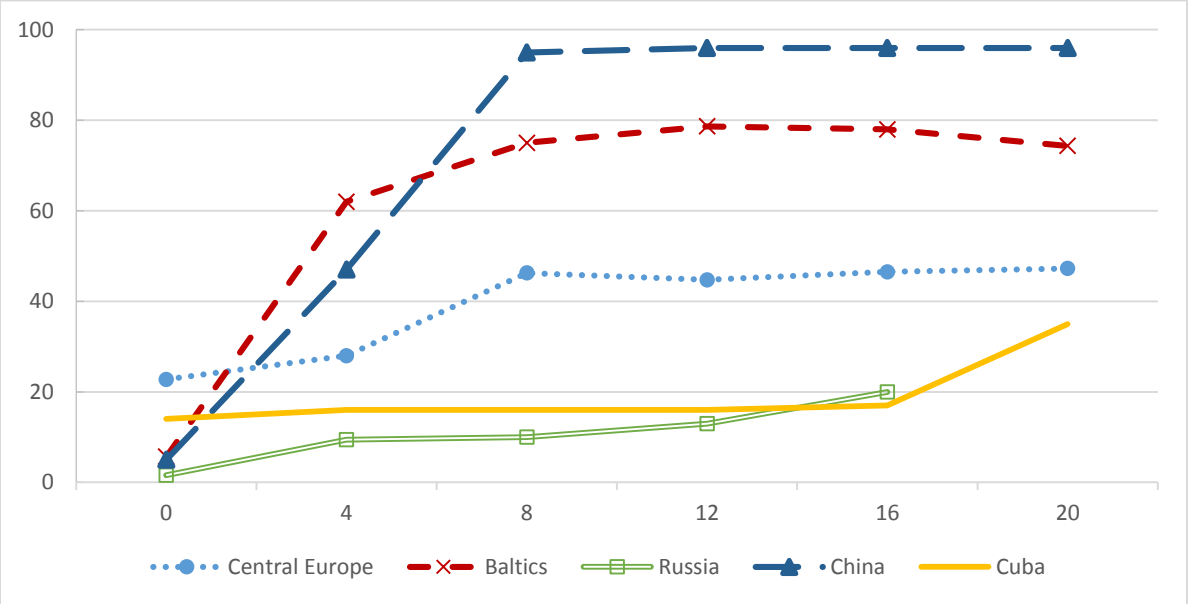
* The year 0 of the transition is 1979 in China, 1989 in the other countries and regions. The Baltics include Estonia, Latvia and Lithuania. Central Europe includes the Czech Republic, Hungary, Poland and Slovakia. Figures are averages of each of the countries included in the region.

Figure 12b. Period 1989-2011 (excluding China)



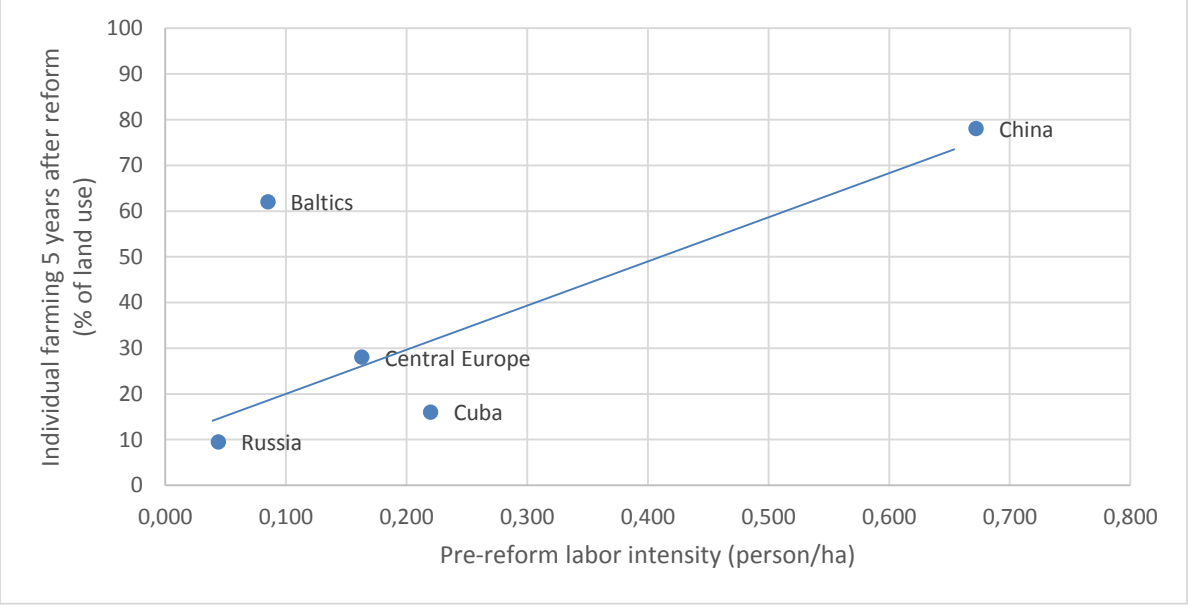
Source: Own calculations based on Swinnen & Rozelle (2006) and data from FAO (2014)

Figure 13. Change in farm organization (Share of individual farms in total agricultural land use) (years after start of the reform)



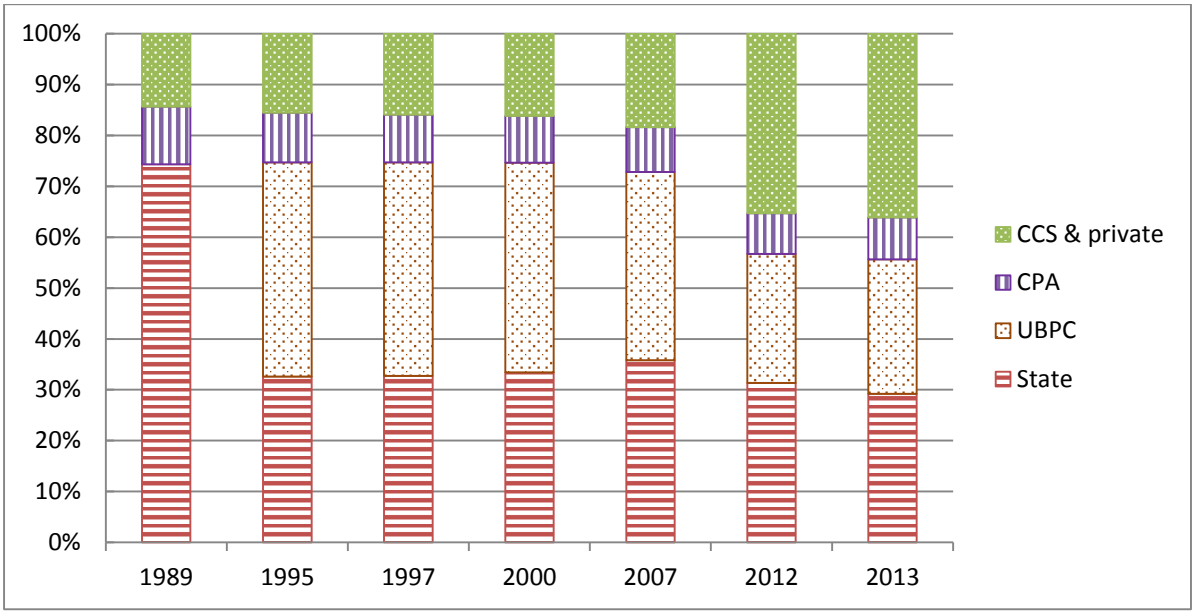
Source: Own calculations based on Swinnen & Rozelle (2006) and data from FAO (2014)

Figure 14. Pre-reform labor intensity and shift to individual farms



Source: Swinnen & Rozelle (2006) and own calculations based on data from FAO (2014)

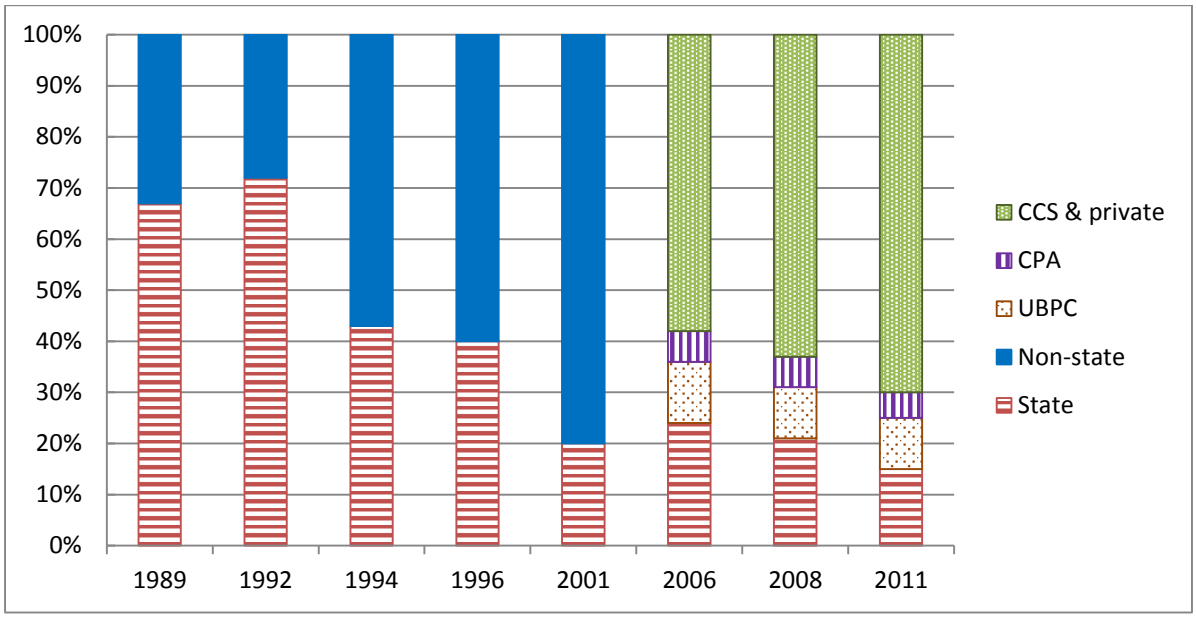
Figure 15. Agricultural land by farm organization (% of total) (selected years)*



Source: Own calculations based on ONEI (2014a,c)

* Non-state agricultural land/production is divided in three main organizations. *Basic Units of Cooperative Production (UBPCs):* emerged in 1993 from state farms, populated by former state farm workers on land owned by the state with open-ended, rent-free usufruct, and soft credit for the purchase of existing crops, machinery and infrastructure; *Agriculture Production Cooperatives (CPAs)*: date back to the 70s, formed by small farmers pooling their lands, machinery and equipment. CPA members convey their means to the cooperatives, are paid and become owners and collective workers (unlike CCSs); and *Cooperatives of Credits and Services (CCSs) and private farmers*: CCSs enable the sharing of irrigation and installations, productive means and collective arrangements for credit but the land, tools and production of each farm remains private. Out of the three types of cooperatives, the latter have the highest degree of independence from the state.

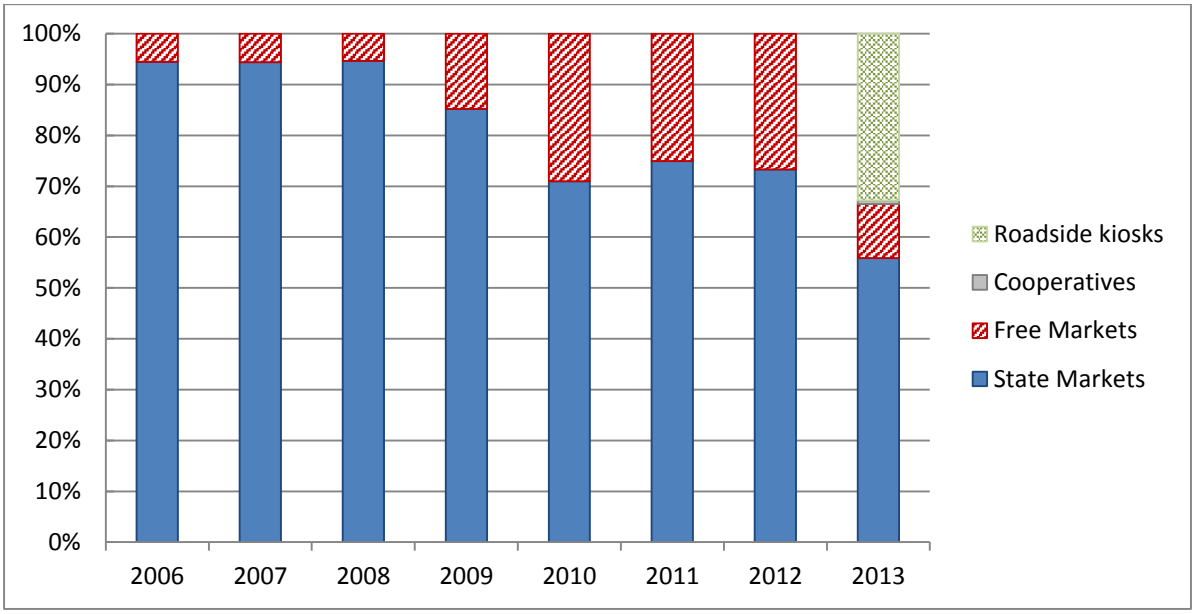
Figure 16. Agricultural production by farm organization (% of total) (selected years)[*]



Source: Herrera Sorzano et al. (2012)

[*] Non-state agricultural land/production is divided in three main organizations. *Basic Units of Cooperative Production (UBPCs):* emerged in 1993 from state farms, populated by former state farm workers on land owned by the state with open-ended, rent-free usufruct, and soft credit for the purchase of existing crops, machinery and infrastructure; *Agriculture Production Cooperatives (CPAs)*: date back to the 70s, formed by small farmers pooling their lands, machinery and equipment. CPA members convey their means to the cooperatives, are paid and become owners and collective workers (unlike CCSs); and *Cooperatives of Credits and Services (CCSs) and private farmers*: CCSs enable the sharing of irrigation and installations, productive means and collective arrangements for credit but the land, tools and production of each farm remains private. Out of the three types of cooperatives, the latter have the highest degree of independence from the state.

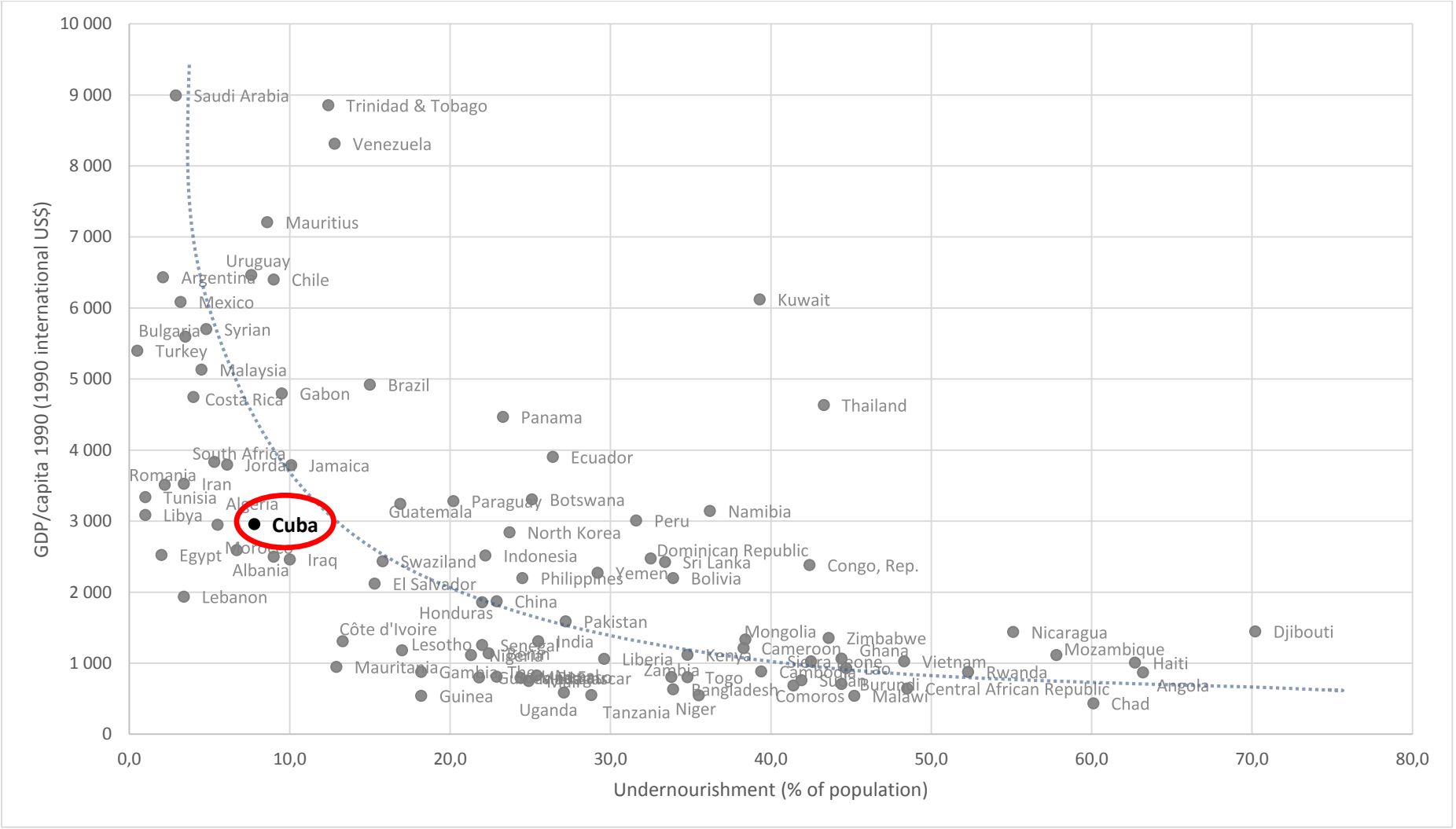
Figure 17. Market channel of agricultural products (2006-2013)[*]



[*] Disaggregated data including information on sales through cooperatives and sales kiosks is not available before 2013. *Roadside kiosks*: are administrated by any of the following production entities: state, UBPCs, CPAs, or CCSs or private farmers on their production area. *Cooperatives* (non-agricultural): sales on markets leased from state entities, free sales of most products and sale of some products subject to rationing by the state at higher prices (potato, rice, eggs and beans). *Free markets*: prices are set according to supply and demand. *State markets:* prices are capped.

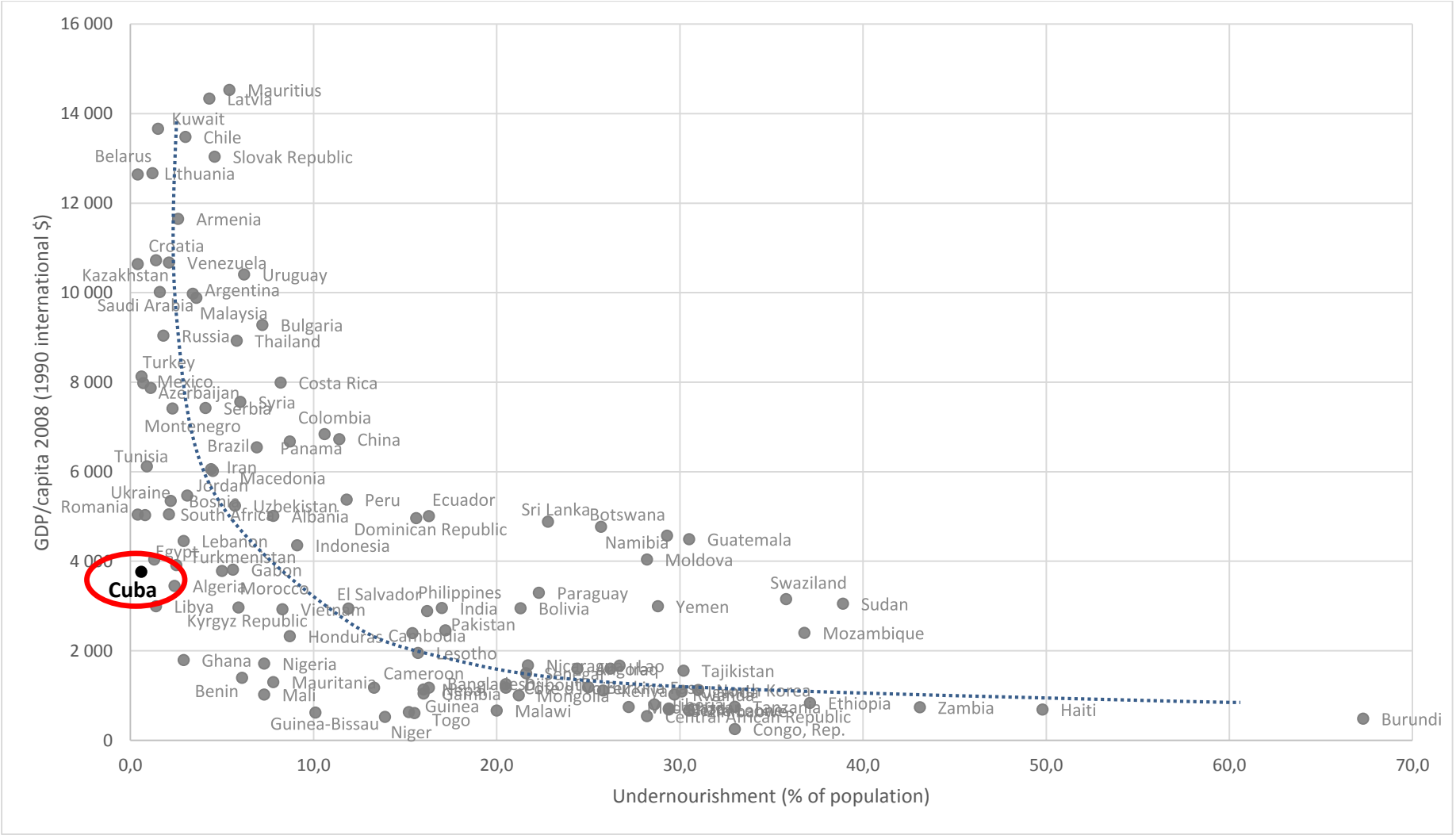
Source: Own calculations based ONEI (2014b)

Figure 18. GDP per capita and food security in 1990 (all available countries)



Source: The Maddison-Project (2013) and IFPRI (2014)

Figure 19. GDP per capita and food security in 2008 (all available countries)



Source: The Maddison-Project (2013) and IFPRI (2014)

Appendix

Table A1: Selected initial condition indicators for immediate pre-reform period in transition countries[a]

	Share of agr. in empl. (%)	GNP/capita (PPP$ 1989)	Labour/land (Pers./ha)	Agr. land in indiv. farms (%)	CMEA export (% of GDP)	Years central planning
Cuba	**19.1**	**2000**	**0.220**	**14**	**0.24**	**30**
East Asia ($\bar{X}$)	**68.7**	**950**	**1.313**	**22**	**0.03**	**29**
China	69.8	800	0.672	5-10	0.01	42
Viet Nam	70.2	1100	2.298	5	0.05	21
Laos	n.a.	n.a.	n.a.	54	n.a.	16
Myanmar	66.2	n.a.	0.970	99	n.a.	38
Central Asia ($\bar{X}$)	**35.8**	**3398**	**0.074**	**3**	**0.24**	**71**
Mongolia	32.7	2100	0.002	0	0.17	n.a.
Kazakhstan	22.6	5130	0.008	0	0.18	71
Kyrgyzstan	32.6	3180	0.054	4	0.21	71
Tajikistan	43.0	3010	0.185	4	0.22	71
Turkmenistan	41.8	4230	0.015	2	0.34	71
Uzbekistan	39.2	2740	0.109	5	0.24	71
Transcaucasus	**24.4**	**5274**	**0.213**	**7**	**0.24**	**70**
Armenia	17.4	5530	0.218	7	0.21	71
Azerbaijan	30.7	4620	0.203	2	0.33	70
Georgia	25.2	5590	0.217	12	0.19	70
European CIS	**21.0**	**6270**	**0.134**	**6**	**0.27**	**68**
Belarus	19.1	7010	0.105	7	0.45	72
Moldova	32.5	4670	0.269	7	0.25	51
Russia	12.9	7720	0.044	2	0.13	74
Ukraine	19.5	5680	0.118	6	0.25	74
Baltics ($\bar{X}$)	**15.4**	**7973**	**0.085**	**6**	**0.31**	**51**
Estonia	12.0	8900	0.072	4	0.27	51
Latvia	15.5	8590	0.085	4	0.31	51
Lithuania	18.6	6430	0.098	9	0.34	51
Central Europe	**16.6**	**7040**	**0.163**	**21**	**0.12**	**42**
Czech Rep	9.9	8600	0.122	1	0.10	42
Hungary	17.9	6810	0.131	13	0.10	42
Poland	26.4	5150	0.258	76	0.17	41
Slovakia	12.2	7600	0.139	2	0.10	42
Balkans ($\bar{X}$)	**26.9**	**4768**	**0.270**	**29**	**0.07**	**45**
Albania	49.4	1400	0.627	3	0.02	47
Bulgaria	18.1	5000	0.132	14	0.15	43
Romania	28.2	3470	0.204	14	0.03	42
Slovenia	11.8	9200	0.116	83	0.07	46

[a] Pre-reform indicators are from 1978 for China, 1981 for Vietnam, 1986 for Laos, 1989 for the Central and Eastern European Countries and Myanmar and 1990 for the Former Soviet Union and Mongolia.

Source: Macours & Swinnen (2002) and own calculations based on data from CIA (1990), Molina (2005), FAO (2014) and World Bank (2014)

Table A2. Gross Agricultural Output index and year on year growth, with sectoral contributions (sugar, fruit & vegetables and other)

	GAO index (1989=100) and sectoral contribution				GAO year on year % change and sectoral contribution			
	GAO	Sugar	Fruit & Veg.	Other	GAO	Sugar	Fruit & Veg.	Other
1989	100	57	12	32	-1%	1%	0%	-2%
1990	99	57	12	31	-6%	-1%	0%	-5%
1991	93	60	13	28	-13%	-10%	2%	-5%
1992	81	57	17	26	-27%	-19%	-4%	-3%
1993	59	52	17	32	0%	-1%	-2%	3%
1994	59	51	15	34	-7%	-11%	4%	1%
1995	55	42	20	38	17%	10%	3%	4%
1996	65	44	20	36	-5%	-3%	-1%	-1%
1997	62	44	20	36	-5%	-7%	2%	0%
1998	59	39	24	37	18%	1%	12%	5%
1999	69	34	30	36	14%	2%	11%	1%
2000	79	32	36	32	-2%	-4%	2%	-1%
2001	77	29	39	32	4%	2%	0%	2%
2002	81	30	37	33	-2%	-11%	10%	-1%
2003	79	19	48	33	4%	1%	4%	-1%
2004	82	20	50	30	-19%	-10%	-6%	-3%
2005	67	12	54	34	-13%	-1%	-12%	0%
2006	58	13	48	39	8%	1%	1%	7%
2007	63	13	45	42	2%	4%	-4%	2%
2008	64	17	40	43	4%	-1%	2%	2%
2009	67	16	41	43	-11%	-4%	-3%	-4%
2010	60	13	42	44	11%	5%	3%	3%
2011	66	17	41	42				

Note : The category ‘other’ is computed as the difference between the total and sugar and fruit and vegetables. Data from columns 6-9 was used to draw Figure 7.

Source : Own calculations based on data from FAO (2014)